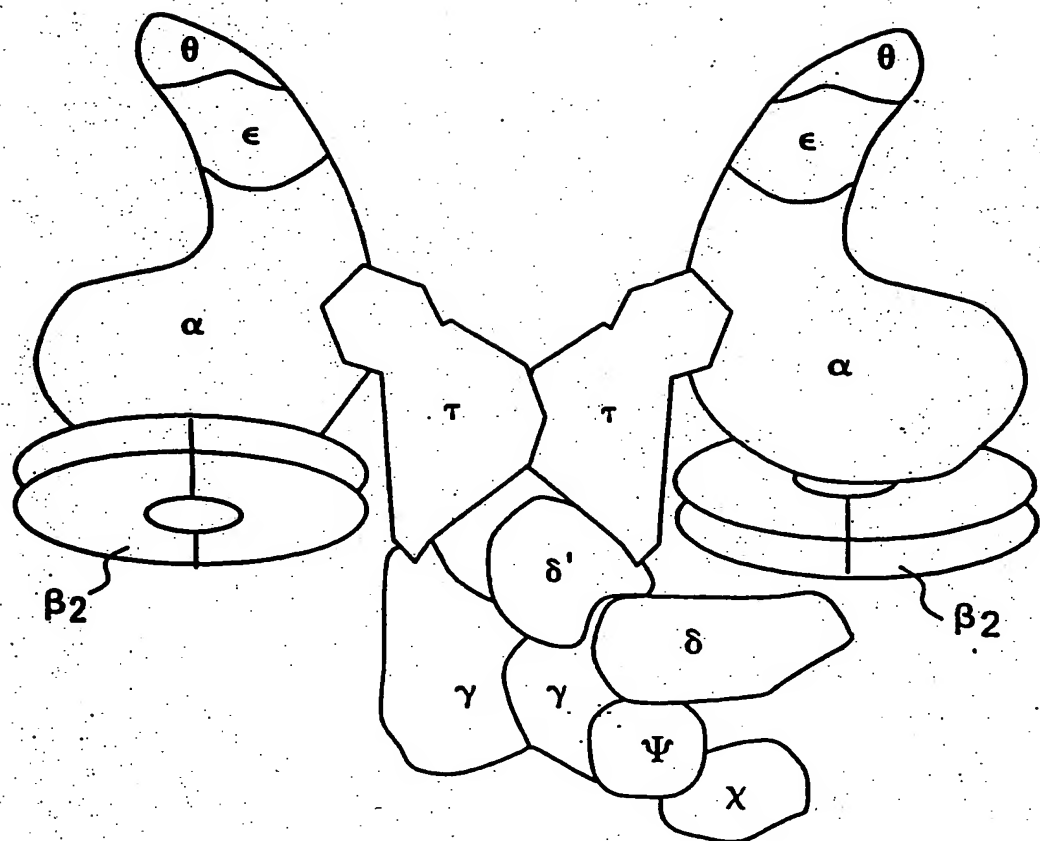


FIG.1



BEST AVAILABLE COPY

# ATP binding

E. coli  
 MSYQVLARKWRPQTFADVVGQEHVLTALANGLSLGRIHHAYLFSGTRGVGKTSIARLLAK  
 B. subtilis  
 MSYQALYRVFRPQRFEDVVGQEHITKTLQNALLQKKFSHAYLFSGPRGTGKTSAAKIFAK  
 \*\*\* \*

E. coli  
 GLNCETGITATPCGVCDNCREIEQGRFVDLIEIDAASRTKVEDTRDLLDNVQYAPARGRF  
 B. subtilis  
 AVNCEHAPVDEPCNECAACKGITNGSISDVIEIDAASNNGVDEIRDIDKVKFAPSATY  
 \*\*\* \*

E. coli  
 KVYLIDEVHMLSRHSFNALLKTLEPPPEHVKFLATTDPQKLPVTILSRCLQFHLKALDV  
 B. subtilis  
 KVIIDEVHMLSIGAFNALLKTLEPPPEHCIFILATTEPHKIPLTIISRCQRFDFKRITS  
 \*\*\* \*

FIG. 2

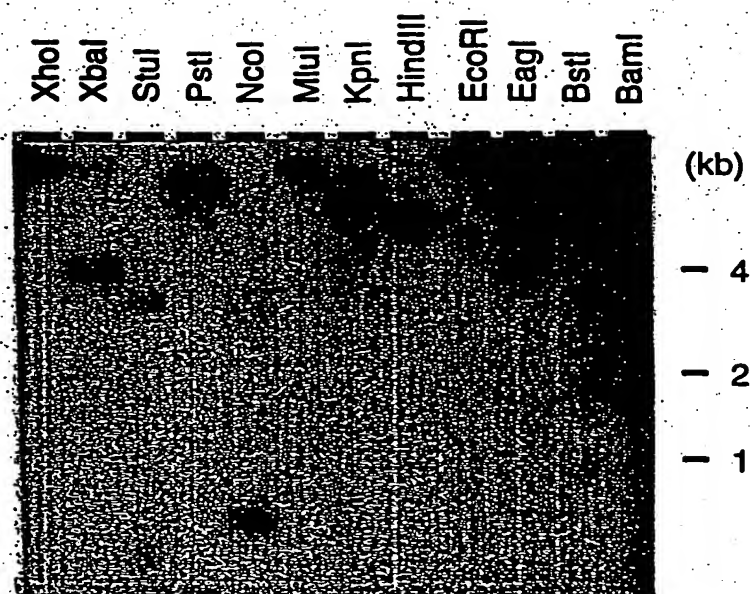


FIG.3

TCCGGGGTG	GGGTCCAG	GTAGACCCG	GGCCCTCCG	TGAGCCCTT	TACCCAGGCC	60
GCCACCTCCT	CCAGGGGGC	CAAGCGTGC	AAGGAGGA	ACGTCCGCAC	CACGCCCTAT	120
					S.D.	
ACTAGCCTT	GTG AGC GCC CTC TAC CGC CGC TTC CGC CCC CTC ACC TTC CAG GAG GTG GTG					180
	met ser ala leu tyr arg arg phe arg pro leu thr phe gln glu val val					(17)
GGG CAG GAG CAC GTG AAG GAG CCC CTC CTC AAG GCC ATC CGG GAG GGG AGG CTC GCC CAG					CAC	240
gly gln glu his val lys glu pro leu leu lys ala ile arg glu gly arg leu ala gln						(37)
GCS TAC CTS TTC TCC GGS AC						
GCC TAC CTC TTC TCC GGG CCC AGG GGC GTG GGC AAG ACC ACC ACG GCG AGG CTC CTC GCC						300
ala tyr leu phe ser gly pro arg gly val gly lys thr thr ala arg leu leu ala						(57)
ATG GCG GTG GGG TGC CAG GGG GAA GAC CCC CCT TGC GGC GTG TGC CCC CAC TGC CAG GCG						360
met ala val gly cys gln gly glu asp pro pro cys gly val cys pro his cys gln ala						(77)
GtG CAG AGG GGC GCC CAC CCG GAC GTG GTG GAC ATT GAC GCC GCG AAC AAC TCC GTG						420
val gln arg gly ala his pro asp val val asp ile asp ala ala ser asn ser val						(97)
GAG GAC GTG CGG GAG CTG AGG GAA AGG ATC CAC CTC GCC CCC CTC TCT GCC CCC AGG AAG						480
glu asp val arg glu leu arg glu arg ile his leu ala pro leu ser ala pro arg lys						(117)
					C	
GTC TTC ATC CTG GAC GAG GCC CAC ATG CTC TCC AAA AGC GCC TTC AAC GCC CTC CTC AAG						540
val phe ile leu asp Glu ala his met leu ser lys ser ala phe asn ala leu leu lys						(137)

**FIG. 4A-1**



TGS CTS CTC CTC GGS GGS CTC GTG	
ACC CTG GAG GAG CCC CCG CCC CAC GTC TTC GTC TTC GCC ACC GAG CCC GAG AGG	600
thr leu glu glu pro pro his val phe val phe leu leu phe val phe ala thr thr glu pro glu arg	(157)
ATG CCC CCC ACC ATC CTC TCC CGC ACC CAG CAC TTC CGC TTC CGC CTC ACG GAG GAG	660
met pro pro thr ile leu ser arg thr gln his phe arg phe arg arg leu thr glu glu	(177)
GAG ATC GCC TTT AAG CTC CGG CGC ATC CTG GAG GCC GTG GGG CGG GAG GCG GAG GAG GAG	720
glu ile ala phe lys leu arg arg ile leu glu ala val gly arg glu ala glu glu glu	(197)
GCC CTC CTC CTC GGC CTC CGC CGC GCG GAC GCG GCG CTT AGG GAC GCG GAA AGC CTC CTG	780
ala leu leu leu leu ala arg leu ala arg gly ala leu arg asp ala glu ser leu leu	(217)
GAG CGC TTC CTC CTC GAA GGC CCC CTC ACC CGG AAG GAG GTG GAG CGC GCC CTA GGC	840
glu arg phe leu leu leu glu gly pro leu thr arg lys glu val glu arg ala leu gly	(237)
TCC CCC CCA GGG ACC GGG GTG GCC GAG ATC GCC GCG TCC CTC GCG AGG GGG AAA ACG GCG	900
ser pro pro gly thr gly val ala glu ile ala ala ser leu ala arg gly lys thr ala	(257)
GAG GCC CTG GGC CTC GCG CGC CTC TAC GGG GAA GGG TAC GCC CCG AGG AGC CTG GTC	960
glu ala leu gly leu ala arg arg leu tyr gly glu gly tyr ala pro arg ser leu val	(277)
TCG GGC CTT TTG GAG GTG TTC CGG GAA GGC CTC TAC GCC GCG TTC GGC CTC GCG GGA ACC	1020
ser gly leu leu glu val phe arg glu gly leu tyr ala ala phe gly leu ala gly thr	(297)
CCC CTT CCC GCC CCG CCC CAG GCC CTG ATC GCC GCG ATG ACC GCC CTG GAG GAG GCC ATG	1080
pro leu pro ala pro pro pro gln ala leu ile ala ala met thr ala leu asp glu ala met	(317)

FIG.4A-2

GAG CGC CTC GCC CGC CGC TCC GAC GCC TTA AGC CTG GAG GTG GCC CTC CTG GAG GCG GGA 1140  
glu arg leu ala arg arg ser asp ala leu ser leu glu val ala leu leu glu ala gly (337)

AGG GCC CTG GCC GAG GCC CTA CCC CAG CCC ACG GGC GCT CCT TCC CCA GAG GTC GGC 1200  
arg ala leu ala ala glu ala leu pro gln pro thr gly ala pro ser pro glu val gly (357)

CCC AAG CCG GAA AGC CCC CCG ACC CCG GAA CCC CCA AGG CCC GAG GAG GCG CCC GAC CTG 1260  
pro lys pro glu ser pro pro thr pro pro glu pro arg pro glu ala pro asp leu (377)

CGG GAG CGG TGG CGG GCC TTC CTC GAG GCC CTC AGG CCC ACC CTA CGG GCC TTC GTG CCG 1320  
arg glu arg trp arg ala phe leu glu ala leu arg pro thr leu arg ala phe val arg (397)

GAG GCC CGC CGG GAG GTC CCG GAA GGC CAG CTC TGC CTC GCT TTC CCC GAG GAC AAG GCC 1380  
glu ala arg pro glu val arg glu gly gln leu cys leu ala phe pro glu asp lys ala (417)

TTC CAC TAC CGC AAG GCC TCG GAA CAG AAG GTG AGG CTC CTC CCC CTC GGC CAG GCC CAT 1440  
phe his tyr arg lys ala ser glu gln lys val arg leu leu pro leu ala gln ala his (437)

frameshift site

TTC GGG GTG GAG GAG GTC GTC CTC GTC GAG GGA GAA AAA AGC CTG AGC CCA AGG 1500  
phe gly val glu glu val val leu val leu glu gly glu lys lys ser leu ser pro arg (457)

FIG.4B-1

CCC CGC CCG GCC CCA CCT CCT GAA GCG CCC GCA CCC CCG GGC CCT CCC GAG GAG GAG GTA	1560
pro arg pro ala pro pro pro glu ala pro ala pro pro gly pro pro glu glu val	(477)
GAG GCG GAG GAA GCG GCG GAG GAG GCC CCG GAG GAG GCG GTG GTC CGC CTC	1620
glu ala glu glu ala ala glu ala pro glu glu ala leu arg arg val arg leu	(497)
CTG GGG GGG CCG GTG CTC TGG GTG CCG CCG AGG ACC CCG GAG CCG CCG GAG GAG GAA	1680
leu gly gly arg val leu trp val arg arg pro arg thr arg glu ala pro glu glu glu	(517)
CCC CTG AGC CAA GAC GAG ATA GGG GGT ACT GGT ATA TAA	1740
pro leu ser gln asp glu ile gly thr gly ile *	(529)
CGACCTCGGA CAAGAGACCG TGGACAACAT CCTCAAGCGC CTCCGCCCGTA TTGAGGGCCA	1820
GGTGCGGGGG CTCCAGAAGA TGGTGGCCGA GGGCCGCCCC TGCACGAGG TCCTCACCCA	1880
GATGACCGCC ACCAAGAAG CCATGGAGC GGCGGCCACC CTGATCCTCC ACGAGTTCCT	1940
GAACGTCTGC GCCGCCGAGG TCTCCGAGG CAAGGTGAAC CCGAGGAGAT	2000
CGCCACCATG CTGAAGAACT TCATCTA	2027

FIG. 4B-2

GGG CAG GAG	GTG AGC	GCC CTC	TAC CGC	CGC CGC	TTC CGC	CCC CTC	ACC CTC	TTC CAG	GAG GTG	GTG	51
GCC TAC CTC	TTC TCC	GGG CCC	AGG GAG	CTC ATC	AAG GCC	ATC CGG	GAG GGG	AGG CTC	GCC CAG		111
ATG GCG GTG	GGG TGC	CAG GAA	GAC CCC	CGG GGC	CCT TGC	GGG GTC	ACC ACC	AGG CTC	GCC CTC		171
GtG CAG AGG	GGC GGC	CAC CCG	GAC GTG	GAC GGC	ATT GAC	GAC GGC	GCC GGC	AAC AAC	TCC GTG		231
GAG GAC GTG	CGG GAG	CTG AGG	GAA AGG	ATC AGC	CAC CTC	GCC GGC	CTC TCT	GCC CCC	AGG AAG		291
GTC TTC ATC	CTG GAC	GAG GCC	CAC ATG	CTC ATG	TCC AAA	AGC GGC	TTC AAC	GCC CTC	CTC AAG		351
ACC CTG GAG	GAG CCC	CCG CCC	CAC GTC	CTC GTC	TTC GTC	GCC GGC	ACC ACC	GAG CCC	GAG AGG		411
ATG CCC ACC	ATC ATC	CTC TCC	CGC ACC	CAG GTC	CAC TTC	CGC GGC	CTC CGC	CTC ACG	GAG GAG		471
GAG ATC GCC	TTT AAG	CTC CTC	CGC ATC	CTG GGC	GAG GCC	GTG GGC	GAG GGC	GAG GAG	GAG GAG		531
GCC CTC CTC	CTC CTC	GCC CGC	CTG GGC	GAC GGC	GGG GGC	CTT AGG	GAC GGC	GAA AGC	CTC CTG		591
GAG CGC TTC	CTC CTC	CTG GAA	GGC GGC	CCC CTC	ACC CGG	AAG GAG	GTG GAG	CGC GGC	CTA GGC		651
TCC CCC CCA	GGG ACC	GGG GTG	GCC GTC	ATC GAG	GCC GGC	TCC CTC	GCG AGG	GGG AAA	ACG GCG		711
GAG GCC CTG	GCG CTC	GCC CGG	CGC GTC	CTC GCG	TAC GGC	GAG TAC	GCC CCG	AGG AGC	CTG GTC		771
TCG GGC CTT	TTG GAG	GTG TTC	CGG GAA	GGC GGC	CTC TAC	GCC GGC	TTC GGC	CTC GCG	GGA ACC		831
CCC CTT CCC	GCC CCG	CCC CAG	GCC CTG	ATC GGC	GCC GGC	ATG ACC	GCC CTC	GAG GGC	GCC ATG		891
GAG CGC CTC	GCC CGC	GCC TCC	GAC GGC	CTG GGC	TTA AGC	CTG GAG	GCC CTC	GAG GGC	GGA GGA		951
AGG GCC CTG	GCC GCG	GAG GCC	CTA CCC	CAG GGC	CCC ACG	GGC GGT	CCT TCC	CCA GAG	GTC GGC		1011
CCC AAG CCG	GAA AGC	CCC CCG	ACC ACC	CGG GAA	CCC CCA	AGG CCC	GAG GAG	GCG CCC	GAC CTG		1071
CGG GAG CGG	TGG CGG	GCC GTC	CTC GAG	GCC GGC	CTC AGG	CCC ACC	CTA CGG	GCC TTC	GTG CGG		1131
GAG GCC CGC	CGC GAG	GTC CGG	GAA GGC	CAG GGC	CTC TGC	CTC GCT	TTC CCC	GAG GAG	GCC GGC		1191
TTC CAC TAC	CGC AAG	GCC TCG	GAA CAG	AAG GTC	CTC AGG	CTC CTC	CCC CTG	GCC CAG	GCC CAT		1251
TTC GGG GTG	GAG GAG	GTC GTC	CTC GTC	CTG GAG	GGA GAA	AAA AGC	CTG AGC	CTG AGC	CCA, AGG		1311
CCC CGC CCG	GCC CCA	CCT CCT	GAA GCG	CCC GCA	CCC CCG	GGC CCT	CCC GAG	GAG GTA	GTA GTA		1371
GAG GCG GAG	GAA GCG	GCG GAG	GAG GCG	CCG GAG	GAG GCG	TTG AGG	CGG GTG	GTC CGC	CTC CTC		1431
CTG GGG GGG	CGG GTG	CTC TGG	GTG CGG	CGG ACC	AGG ACC	CGG GAG	GCG CCG	GAG GAG	GAA GAA		1491
CCC CTG AGC	CAA GAC	GAG ATA	GGG GGT	ACT GGT	ATA TAA	(1590)					1551

FIG.4C

Met	ser	ala	leu	tyr	arg	arg	pro	leu	thr	phe	gln	glu	val	gly	gln	glu	20
his	val	lys	glu	pro	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	40
phe	ser	gly	pro	arg	gly	val	lys	thr	thr	ala	arg	leu	leu	ala	met	ala	60
gly	cys	gln	gly	glu	asp	pro	pro	cys	gly	val	cys	pro	his	cys	gln	ala	80
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	pro	asn	ser	val	glu	100
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	120
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	140
glu	pro	pro	pro	his	val	leu	phe	val	ala	thr	thr	glu	pro	glu	arg	met	160
thr	ile	leu	ser	arg	thr	gln	his	phe	arg	phe	arg	leu	thr	glu	glu	glu	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	val	gly	arg	glu	ala	glu	glu	ala	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	asp	ala	glu	ser	leu	leu	220
leu	leu	leu	glu	gly	pro	leu	thr	arg	lys	glu	val	glu	arg	ala	leu	gly	240
gly	thr	gly	val	ala	glu	ile	ala	ala	ser	leu	ala	arg	gly	lys	thr	ala	260
gly	leu	ala	arg	arg	leu	tyr	gly	glu	tyr	ala	ala	pro	arg	ser	leu	val	280
leu	glu	val	phe	arg	glu	glu	gly	leu	gly	ala	phe	gly	leu	ala	gly	thr	300
ala	pro	pro	gln	ala	leu	ile	ala	ala	met	thr	ala	leu	asp	glu	ala	met	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	leu	glu	ala	gly	340
ala	ala	glu	ala	leu	pro	gln	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	360
glu	ser	pro	pro	thr	pro	glu	pro	pro	arg	pro	glu	ala	pro	asp	leu	arg	380
trp	arg	ala	phe	leu	glu	ala	ala	leu	arg	pro	thr	leu	phe	val	arg	glu	400
pro	glu	val	arg	glu	gly	gln	leu	cys	leu	ala	phe	pro	glu	asp	lys	ala	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	pro	leu	ala	gln	ala	his	phe	440
glu	glu	val	val	leu	val	leu	glu	gly	glu	lys	ser	leu	ser	pro	arg	pro	460
ala	pro	pro	pro	glu	ala	pro	ala	pro	pro	gly	pro	glu	glu	val	glu	ala	480
glu	ala	ala	glu	glu	ala	pro	glu	glu	ala	leu	arg	val	val	arg	leu	leu	500
arg	val	leu	trp	val	arg	arg	pro	arg	thr	arg	glu	ala	pro	glu	glu	pro	520
gln	asp	glu	ile	gly	thr	gly	ile										529

FIG.4D

Met	ser	ala	leu	tyr	arg	arg	pro	leu	thr	phe	gln	glu	val	val	gly	gln	glu	20		
his	val	lys	glu	pro	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	tyr	leu	40	
phe	ser	gly	pro	arg	gly	val	gly	lys	thr	thr	thr	ala	arg	leu	leu	ala	met	ala	val	60
gly	cys	gln	gly	glu	asp	pro	pro	cys	gly	val	cys	pro	his	cys	gln	ala	val	gln	arg	80
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	ser	asn	asn	ser	val	glu	asp	val	100
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140
glu	pro	pro	pro	his	val	leu	phe	val	phe	ala	thr	thr	glu	pro	glu	arg	met	pro	pro	160
thr	ile	leu	ser	arg	thr	gln	his	phe	arg	phe	arg	arg	leu	thr	glu	glu	glu	ile	ala	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	val	gly	arg	glu	ala	glu	glu	ala	leu	leu	leu	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	asp	ala	glu	ser	leu	leu	glu	arg	phe	220
leu	leu	glu	gly	pro	leu	thr	arg	lys	glu	val	glu	arg	ala	leu	glu	ser	pro	pro	pro	240
gly	thr	gly	val	ala	glu	ile	ala	ala	ser	leu	ala	arg	gly	lys	thr	ala	glu	ala	leu	260
gly	leu	ala	arg	arg	leu	tyr	gly	glu	gly	tyr	ala	pro	arg	ser	leu	val	ser	gly	leu	280
leu	glu	val	phe	arg	glu	gly	leu	gly	ala	ala	phe	gly	leu	ala	gly	thr	pro	leu	pro	300
ala	pro	pro	gln	ala	leu	ile	ala	ala	met	thr	ala	leu	asp	glu	ala	met	glu	arg	leu	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	leu	glu	ala	gly	arg	ala	leu	340
ala	ala	glu	ala	leu	pro	gln	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	pro	lys	pro	360
glu	ser	pro	pro	thr	pro	glu	pro	pro	arg	pro	glu	ala	pro	asp	leu	arg	glu	arg	arg	380
trp	arg	ala	phe	leu	glu	ala	leu	ala	leu	thr	leu	arg	ala	phe	val	arg	glu	ala	arg	400
pro	glu	val	arg	glu	gly	gln	leu	cys	leu	ala	phe	pro	glu	asp	lys	ala	phe	his	tyr	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	leu	pro	leu	ala	gln	ala	his	phe	gly	val	440
glu	glu	val	val	leu	val	leu	glu	gly	glu	lys	lys	pro	asp	pro	lys	ala	pro	pro	pro	460
gly	pro	thr	ser																	464

FIG. 4E

Met	ser	ala	leu	tyr	arg	arg	phe	pro	leu	thr	phe	gln	glu	val	val	gly	gln	glu	20		
his	val	lys	glu	pro	leu	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	tyr	leu	40	
phe	ser	gly	pro	arg	gly	val	gly	lys	thr	thr	ala	arg	leu	leu	ala	met	ala	val	60		
gly	cys	gln	gly	glu	asp	pro	pro	cys	gly	val	cys	pro	his	cys	gln	ala	val	gln	arg	80	
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	ser	asn	asn	ser	val	glu	asp	val	100	
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120	
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140	
glu	pro	pro	pro	his	val	leu	phe	val	phe	ala	thr	thr	glu	pro	glu	arg	met	pro	pro	160	
thr	ile	leu	ser	arg	thr	thr	gln	his	phe	arg	phe	arg	leu	thr	glu	glu	glu	ile	ala	180	
phe	lys	leu	arg	arg	ile	leu	leu	glu	ala	val	gly	arg	glu	ala	glu	glu	ala	leu	leu	200	
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	asp	ala	glu	ser	leu	leu	glu	arg	phe	220	
leu	leu	leu	glu	gly	pro	leu	ile	ala	lys	glu	val	glu	arg	ala	leu	gly	ser	pro	pro	240	
gly	thr	gly	val	ala	arg	leu	ile	ala	ala	ser	leu	ala	arg	gly	lys	thr	ala	glu	ala	leu	260
gly	leu	ala	arg	arg	leu	leu	tyr	gly	gly	glu	tyr	ala	pro	arg	ser	leu	val	ser	gly	leu	280
leu	glu	val	phe	arg	arg	glu	gly	leu	tyr	ala	ala	phe	gly	leu	ala	gly	thr	pro	leu	pro	300
ala	pro	pro	gln	ala	leu	ile	ala	ala	met	thr	ala	ala	leu	asp	glu	ala	met	glu	arg	leu	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	leu	leu	glu	ala	gly	arg	ala	leu	340
ala	ala	glu	ala	leu	pro	pro	gln	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	pro	lys	pro	360
glu	ser	pro	pro	thr	pro	pro	glu	pro	pro	arg	pro	glu	ala	pro	asp	leu	arg	glu	arg	380	
trp	arg	ala	phe	leu	glu	ala	ala	leu	arg	pro	thr	leu	arg	ala	phe	val	arg	glu	ala	arg	400
pro	glu	val	arg	glu	gly	gln	gln	leu	cys	leu	ala	phe	pro	glu	asp	lys	ala	phe	his	tyr	420
arg	lys	ala	ser	glu	gln	lys	lys	val	arg	leu	leu	pro	leu	ala	gln	ala	his	phe	gly	val	440
glu	glu	val	val	leu	val	leu	leu	glu	gly	glu	lys	lys	lys	ala						454	

FIG.4F

		ATP site	
E.coli	MSYQVLARKWRPQTADVVGQEHVLTALANGLSLGRHHAYLFSGTRGVGKTSIARLLAK	60	
H.inf.	.....K.....II.....KDN.L.....F...	60	
B.sub.	....A.Y.VF...R.E.....ITKT.Q.A.LQKKFS.....P.T....A.KIF..	60	
C.cres.	DA.T.....Y..R..E.LI...AMVRT...AF.T...A..FMLT.V.....TT.....R	113	
M.gen.	-MH..FYQ.Y..IN.KQTL...SIRKI.V.AINRDKLPNG.I...E..T...TF.KII...	59	
T.th.	--VSA.Y.RF..L..QE.....KEP.LKAIRE..LAQ.....P.....TT.....M	58	

	Zn <sup>++</sup> finger	
E.coli	GLNCET----	GITATPCGVCDNCREIEQGRFVDLIEIDAASRTKVEDTRDLLDNVQYAPA 116
H.inf.	....VH-----V.....E.E..KA....N.I.....E.....K.V	116
B.sub.	AV...H----APVDE..NE.AA.KG.TN.SIS.V.....NNG.DEI..IR.K.KF..S	116
C.cres.	A..Y..DTVK.PSVDLTTEGYH..S.IE..HM.VL.L.....DEM.E...G.R...V	173
M.gen.	AI..LN----WDQIDV.NS..V.KS.NTNSAI.IV.....KNGIN.I.E.VE..FNH.F	115
T.th.	AVG.QG-----EDP.....PH.QAVQR.AHP.VVD.....NNS...V.E.RERHL..L	112

E.coli	RGRFKVYLIDEVHMLSRHSFNALLKLTLEPPPEHVKFLLATDPQKLPVTILSRCLQFHLK	176
H.inf.	V.....Y.....	176
B.sub.	AVTY...I.....IGA.....CI.I...E.H.I.L..I...QR.DE.	176
C.cres.	EA.Y...I.....TAA.....P.A..IF...EIR.V.....QR.D.R	233
M.gen.	TFKK...IL..A...TTQ.WGG.....S.PY.L.IFT..EFN.I.L.....QS.FF.	175
T.th.	SAPR..FIL..A...KSA.....P..L.VF...E.ERM.P.....TQH.RFR	172

FIG.5A



E.coli	ALDVEQIRHQLEHILNEEHIAHEPRALQLLARAAGESLRDALSLTDQAIASGDQ--VST	234
H.inf.	...ET..SQH.A...TQ.N.PF.DP..VK..K..Q..I..S.....M..R.--.TN	234
B.sub.	RITSQA.VGRMNK.VDA.QLQV.EGS.EII.S..H.GM.....L....SFSGDI--LKV	234
C.cres.	RVEPDVLVKHFDR.SAK.GARI.MD..A.I.....V..G...L...VQTERGQT.TS	293
M.gen.	KITSDL.LER.ND.AKK.K.KI.KD..IKI.DLSQ.....G...L..LAI.LIVKKL.LL	235
T.th.	R.TE.E.AFK.RR..EAVGREA.EE..L...L.D.A....E..LERFLLLEGP---LTR	229
E.coli	QAVSAMLGTLDDDDQALSLVEAMVEANGERVMALEAAARGIEWEALLVEMLGLLHRIAM	294
H.inf.	NV..N...L...NYSVDILY.LHQG...LL.RTLQRV.DAAGD.DK..G.CAEK..Q..L	294
B.sub.	EDALLIT.AVSQLYIGK.AKSLHDK.VSDALETL..LLQQ.KDPAK.IED.IFYFRDMLL	294
C.cres.	TV.RD...LA.RS.TIA.Y.HVMAGKTKDALEGFRALWGF.ADPAVVMLDV.DHC.AS.V	353
M.gen.	MLKKHLISLIEMQNL.L.KQFYQ.I	260
T.th.	KE.ERA..SPPGTGVAEIAASLARGKTAEALG.ARRLYGE.YAPRS.VSGL.EVVFREGLY	289

FIG.5B

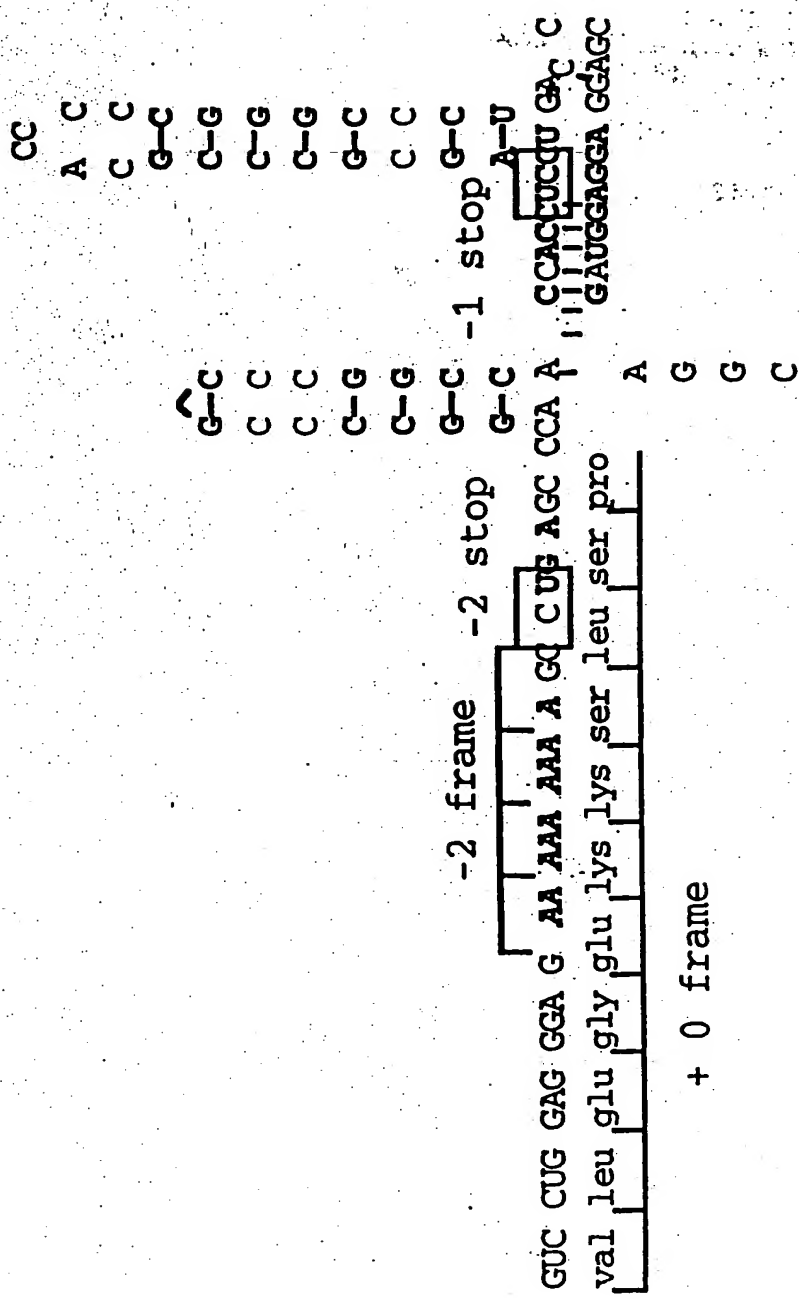


FIG.6

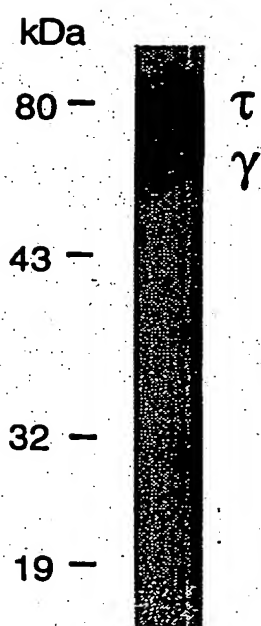
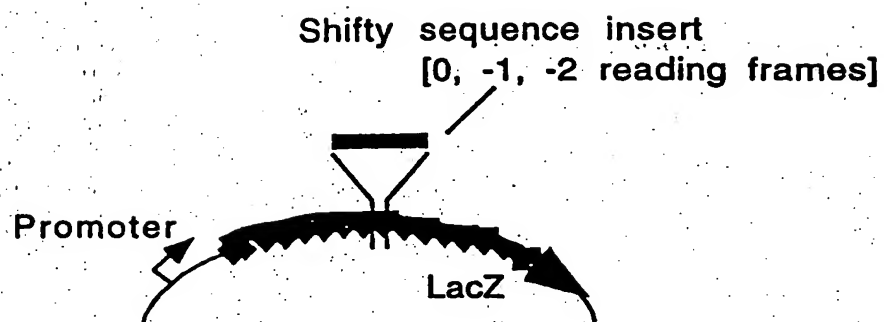


FIG. 7

# FIG.8A



	Reading frame	Blue	White
Shifty sequence	0	+	
	- 1	+	
	- 2	+	
Mutant sequence	0	++	
	- 1		+
	- 2		+

# FIG.8B

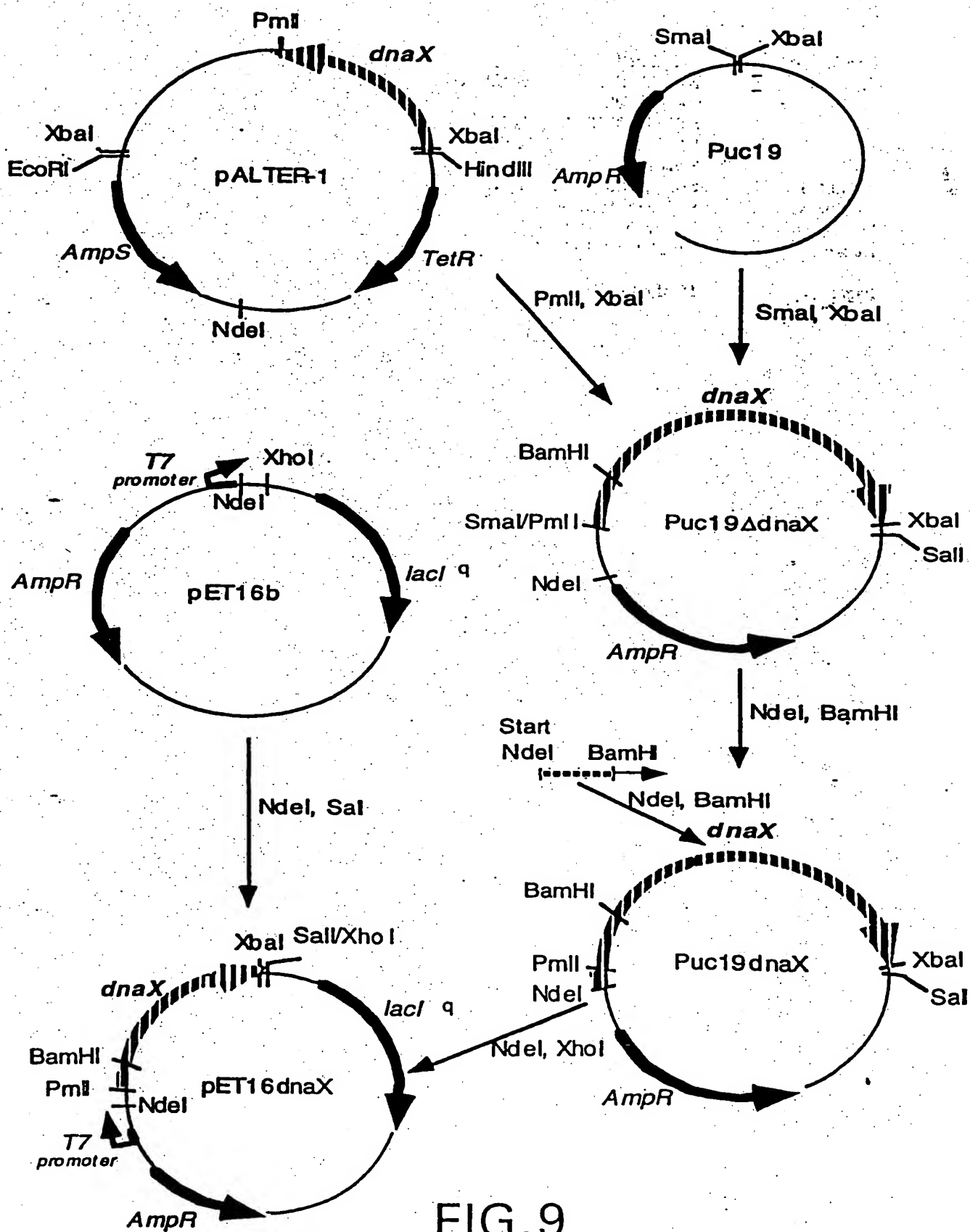


FIG.9

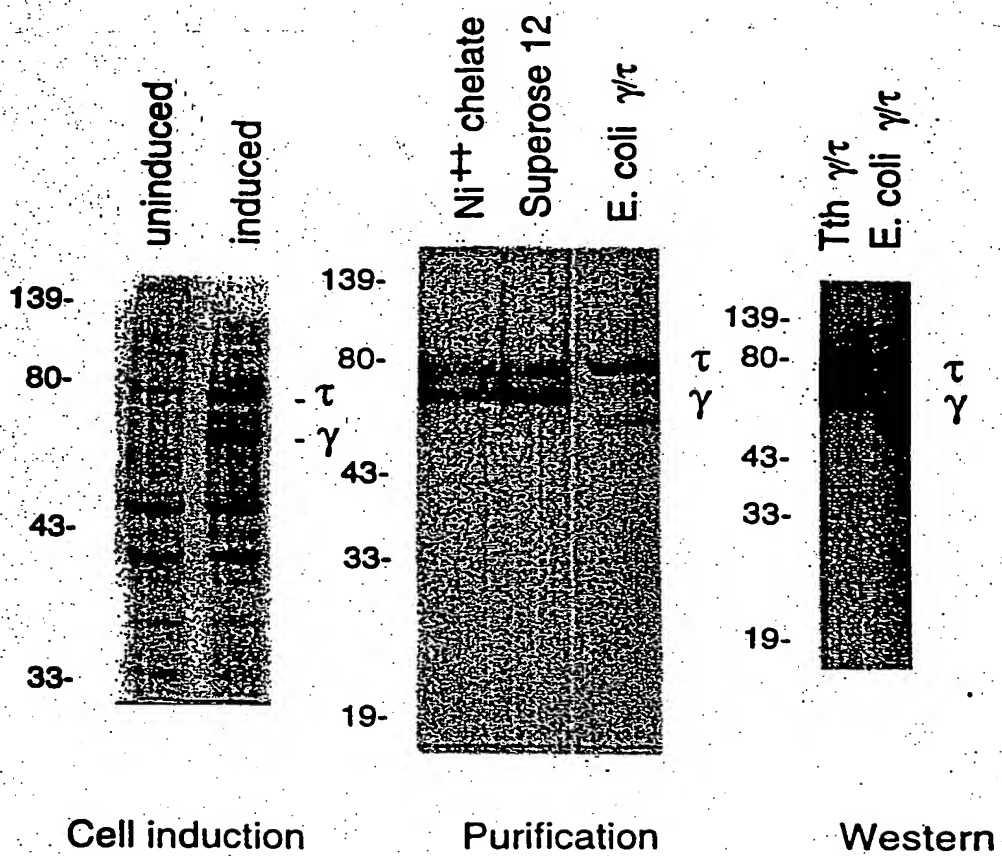


FIG. 10A    FIG. 10B    FIG. 10C

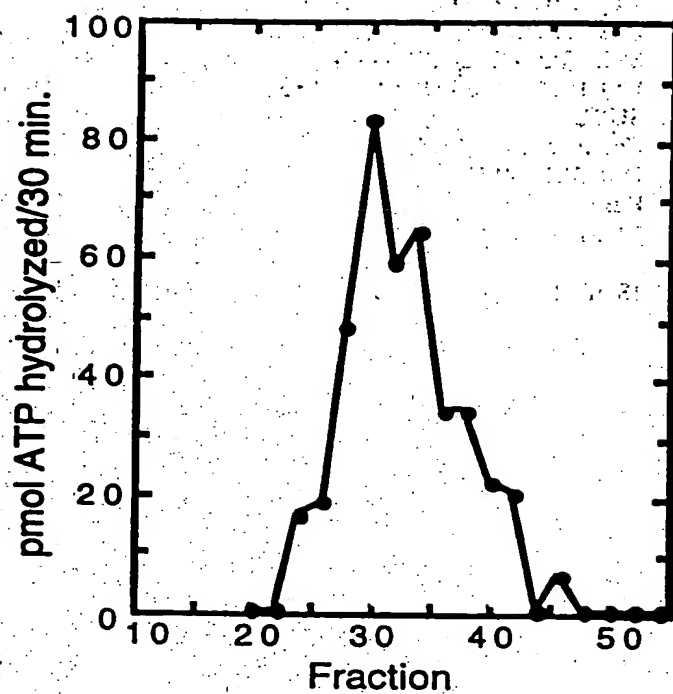


FIG.11A

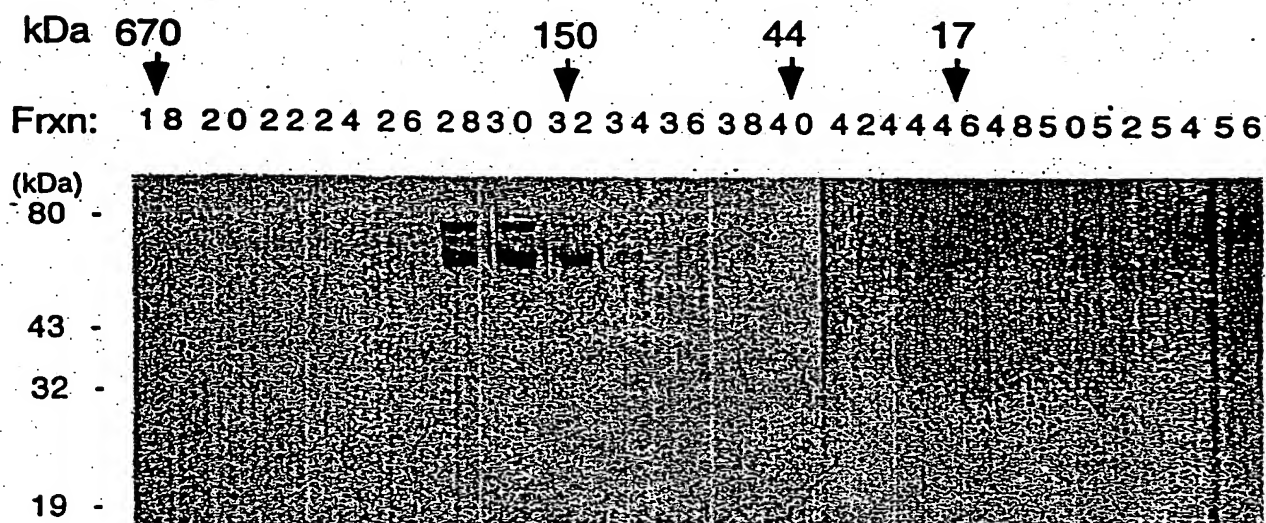


FIG.11B

FIG.12A

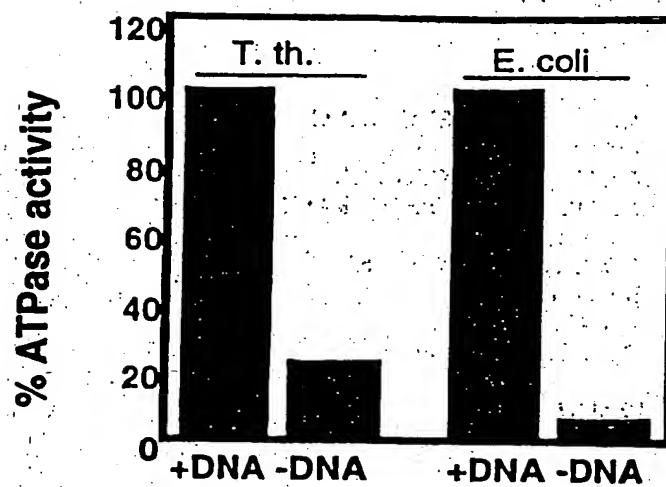


FIG.12B

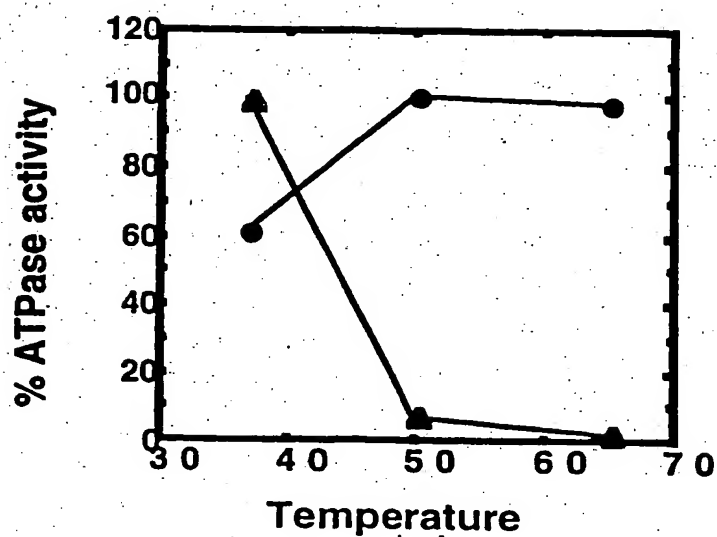
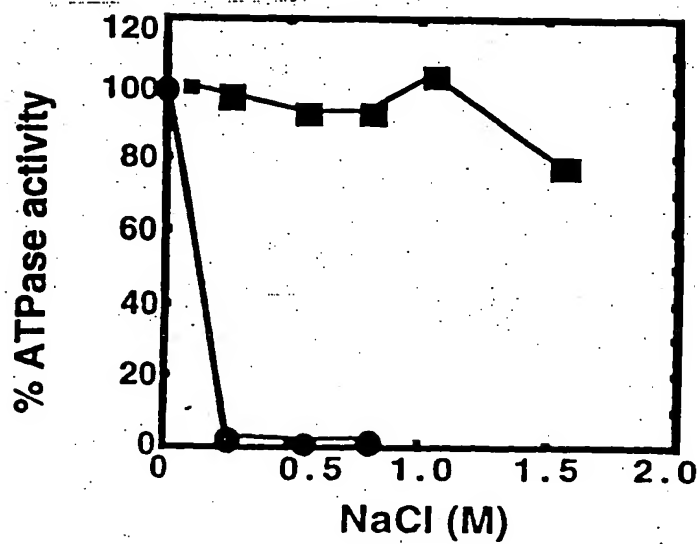
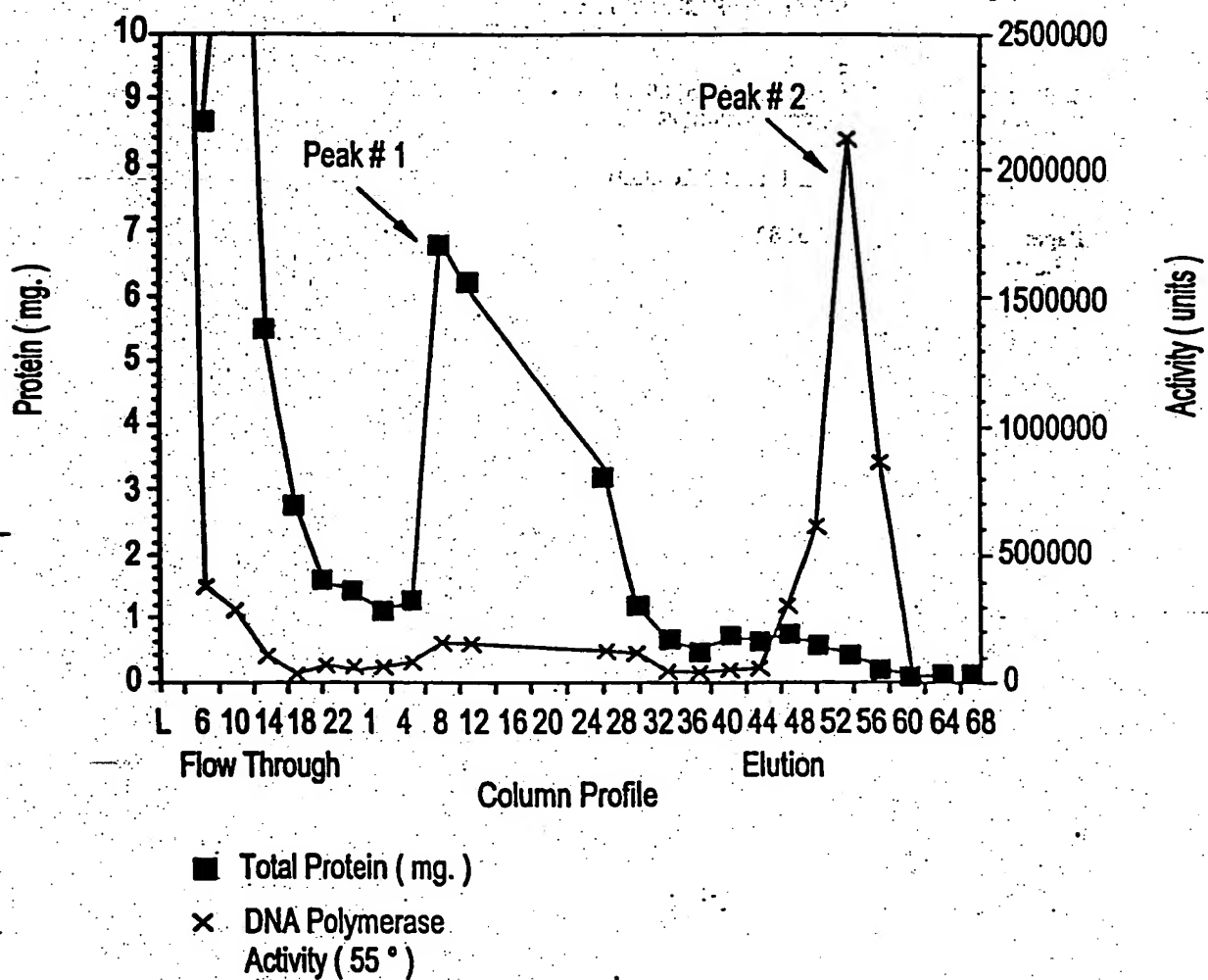


FIG.12C





# FIG.13A



# FIG.13B

ATP Agarose Step Column

FIG.13C

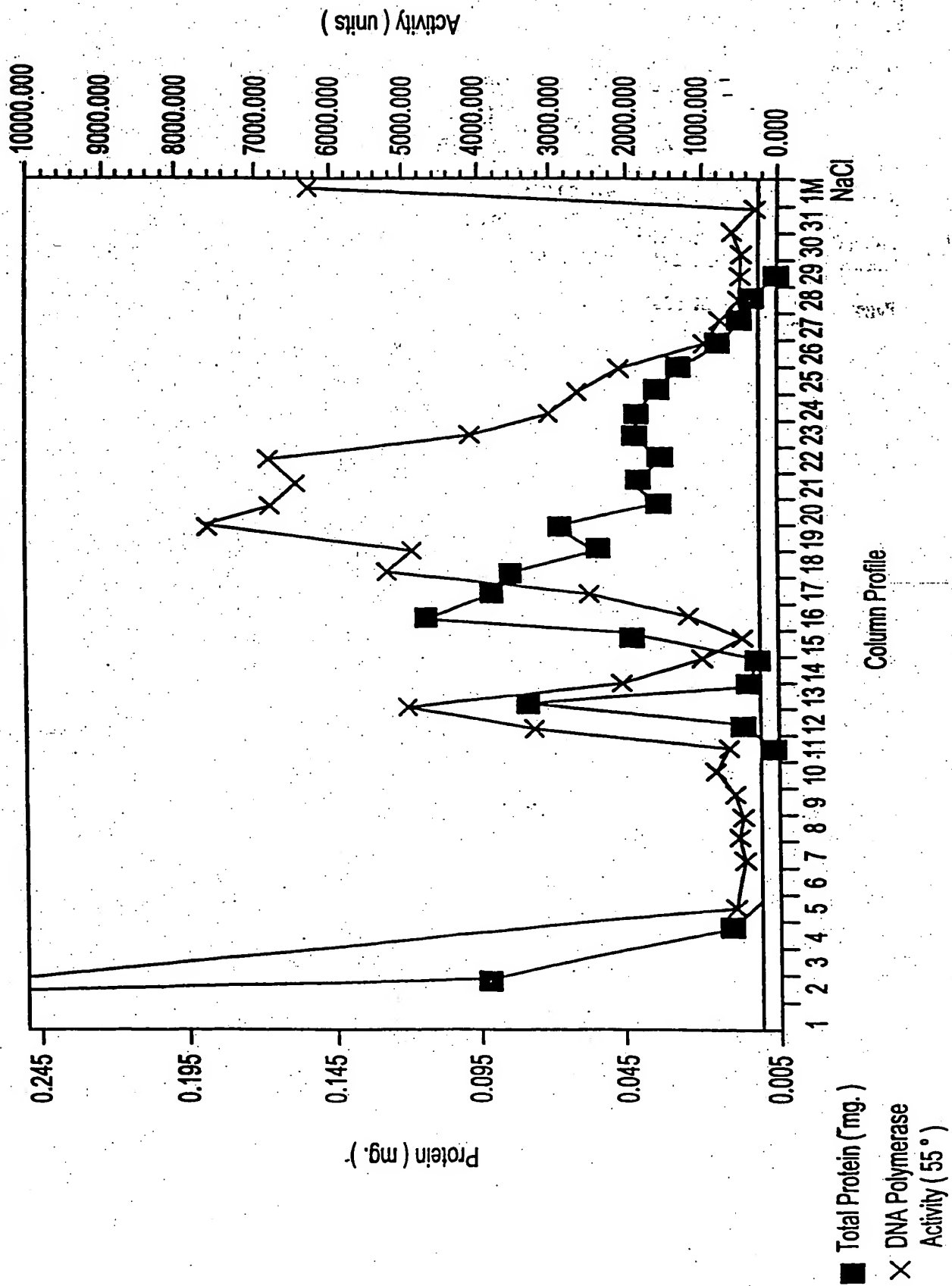
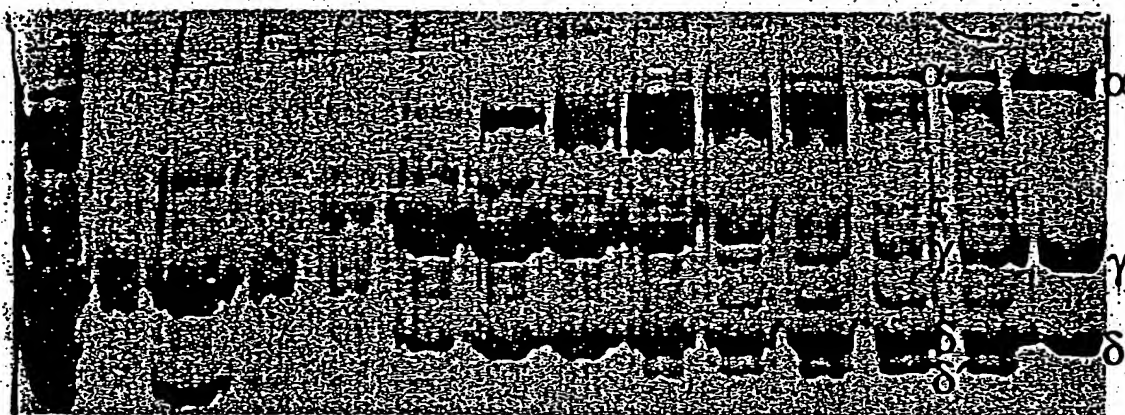


FIG.14A

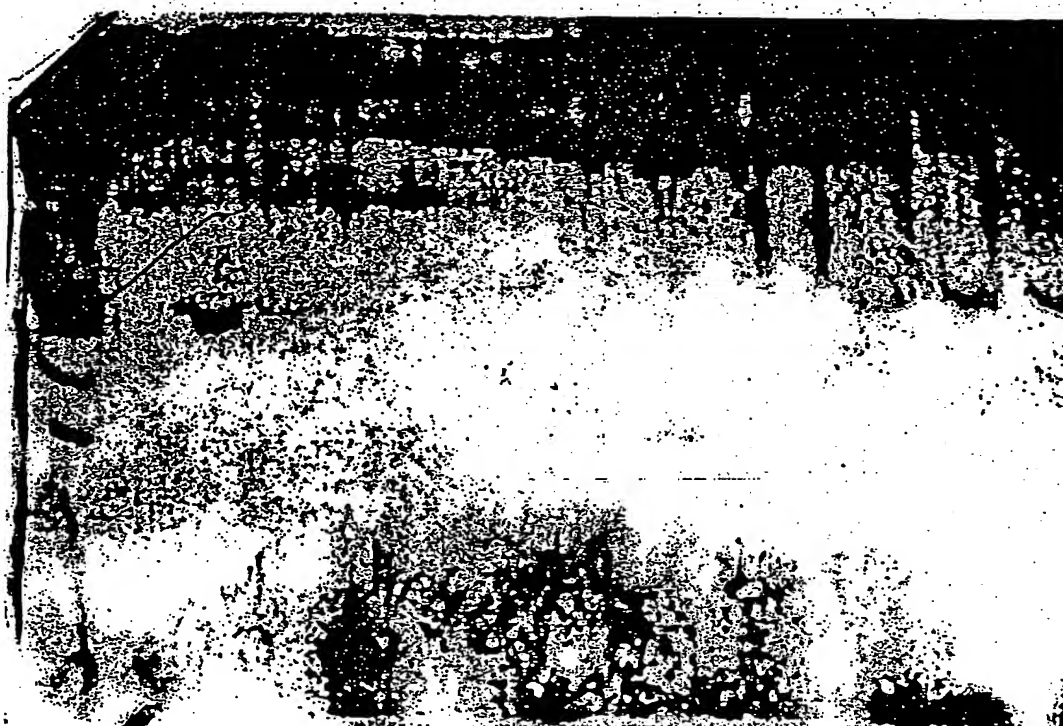
load FT 9 10 11 12 13 14 15 16 17 18 19 *E. coli*  
 $\alpha$   $\gamma$   $\delta$



↑ ↑  
 T.th E. coli  
 subunits subunits

FIG.14B

load FT 9 10 11 12 13 14 15 16 17 18 19



Alignment of TTH1 with alphas subunits of other organisms.

E.coli	DRYFLELIRTPDEESYLHAAVELAEARGLPVV	197	(ID#72)
V.chol.	DHFYLELIRTPGRADEESYLHFALDVAEQYDLPVV	197	(ID#73)
H.inf.	DHFYLAISRTGRPNEERYIQAAKLAERCDDLPLV	197	(ID#74)
R.prow.	DRFYFEIMRHDLPREEQFIENSYIQIASELSIPIV	195	(ID#75)
H.pyl.	DDFYLEIMRHGILDQRFIDEQVIKMSLETGLKII	213	(ID#76)
S.sp.	DDYYLEIQDHGSVEDRLVNINLVKIAQELDIKIV	202	(ID#77)
M.tub.	DNYFLELMDHGLTIERRVRDGLLEIGRALNIPPL	220	(ID#78)
T.th.	FFIEIQNHGLSEQK		(ID#61)

## FIG.15A

Alignment of TTH2 with alphas subunits of other organisms.

E.coli	NKRRAKNGEPLDIAAIPLDDKKSFDMLQRSETTAVFQLESRGMKD	618	(ID#79)
V.chol.	NPRLKKAGKPPVRIEAIPLDDARSFRNLQDAKTTAVFQLESRGMKE	618	(ID#80)
H.inf.	NVRMVRGKPRVDIAAIPLDDPESFELLKRSETTAVFQLESRGMKD	618	(ID#81)
R.prow.	CKLLKEQGIKIDFDDMTFDDKTTYQMLCKGKGVGFQFESIGMKD	624	(ID#82)
H.pyl.	LKIIKTQHKISVDFLSLMDDDPKVYKTIQSGDTVGFQIES-GMFQ	648	(ID#83)
S.sp.	QERKALQIRARTGSKKLPDDVKKTHKLLLEAGDLEGIFQLESQGMKQ	643	(ID#84)
M.tub.	IDNVRANRGIDLDESVPDLDKATYELLGRGDTLGVFQLDGGPMRD	646	(ID#85)
T.th.	RVELDYDALTLDD		(ID#60)

## FIG.15B

ATGGGCCGGGAGCTCCGCTTCGCCCACCTCCACCAGCACA	
CCCAGTTCTCCCTCCTGGACGGGGCGGCGAAGCTTTCCGA	
CCTCCTCAAGTGGGTCAAGGAGACGACCCCGAGGACCCC	120
GCCTTGGCCATGACCGACCACGGCAACCTCTTCGGGGCCG	
TGGAGTTCTACAAGAAGGCCACCGAAATGGGCATCAAGCC	
CATCCTGGGCTACGAGGCCTACGTGGCGGCGGAAAGCCGC	240
TTTGACCGCAAGCGGGGAAAGGGCCTAGACGGGGGCTACT	
TTCACCTCACCCCTCCTCGCCAAGGACTTCACGGGGTACCA	
GAACCTGGTGCGCCTGGCGAGCCGGGCTTACCTGGAGGGG	360
TTTTACGAAAAGCCCCGGATTGACCGGGAGATCCTGCGCG	
AGCACGCCGAGGGCCTCATCGCCCTCTCGGGGTGCCTCGG	
GGCGGAGATCCCCCAGTTCATCCTCCAGGACCGTCTGGAC	480
CTGGCCGAGGCCCGGCTCAACGAGTACCTCTCCATCTTCA	
AGGACCGCTTCTTCATCGAGATCCAGAACCACGGCCTCCC	
CGAGCAGAAAAAGGTCAACGAGGTCTTCAAGGAGTTTCGCC	600
CGAAAGTACGGCCTGGGGATGGTGGCCACCAACGACGGCC	
ATTACGTGAGGAAGGAGGACGCCCGCGCCACGAGGTCCT	
CCTCGCCATCCAGTCCAAGAGCACCTGGACGACCCCGGG	720
CGCTGGCGCTTCCCCTGCGACGAGTTCTACGTGAAGACCC	
CCGAGGAGATGCGGGCCATGTTCCCCGAGGAGGAGTGGGG	
GGACGAGCCCTTTGACAAACACCGTGGAGATCGCCCGCATG	840
TGCAACGTGGAGCTGCCCATCGGGGACAAGATGGTCTACC	
GAATCCCCCGCTTCCCCCTCCCCGAGGGGCGGACCGAGGC	
CCAGTACCTCATGGAGCTCACCTTCAAGGGGCTCCTCCGC	960
CGCTACCCGGACCGGATCACCGAGGGCTTCTACCGGGAGG	
TCTTCCGCCTTTTGGGGAAGCTTCCCCCCCACGGGGACGG	
GGAGGCCTTGGCCGAGGCCTTGGCCCAGGTGGAGCGGGAG	1080
GCTTGGGAGAGGCTCATGAAGAGCCTCCCCCCTTGGCCG	
GGGTCAAGGAGTGGACGGCGGAGGCCATTTTCCACCGGGC	
CCTTTACGAGCTTTCCGTGATAGAGCGCATGGGGTTTCCC	1200
GGCTACTTTCCTCATCGTCCAGGACTACATCAACTGGGCCC	
GGAGAAACGGCGTCTCCGTGGGGCCCCGGCAGGGGGAGCGC	
CGCCGGGAGCCTGGTGGCCTACGCCGTGGGGATCACCAAC	1320
ATTGACCCCTCCGCTTCGGCCTCCTCTTTGAGCGCTTCC	
TGAACCCGGAGAGGGTCTCCATGCCCGACATTGACACGGA	
CTTCTCCGACCGGGAGCGGGACCGGGTGATCCAGTACGTG	1440
CGGGAGCGCTACGGCGAGGACAAGGTGGCCAGATCGGCA	
CCCTGGGAAGCCTCGCCTCCAAGGCCGCCCTCAAGGACGT	
GGCCCGGGTCTACGGCATCCCCACAAGAAGGCGGAGGAA	1560
TTGGCCAAGCTCATCCCGGTGCAGTTCGGGAAGCCCAAGC	
CCCTGCAGGAGGCCATCCAGGTGGTGCCTGGAGCTTAGGGC	
GGAGATGGAGAAGGACCCCAAGGTGCGGGAGGTCTTCGAG	1680
GTGGCCATGCGCCTGGAGGGCCTGAACCGCCACGCCTCCG	
TCCACGCCGCCGGGGTGGTGATCGCCGCCGAGCCCCTCAC	
GGACCTCGTCCCCCTCATGCGCGACCAGGAAGGGCGGGCC	1800
GTCACCCAGTACGACATGGGGGCGGTGGAGGCCTTGGGGC	
TTTTGAAGATGGACTTTTGGGGCCTCCGCACCCTCACCTT	

FIG. 16A

CCTGGACGAGGTCAAGCGCATCGTCAAGGCGTCCCAGGGG	1920
GTGGAGCTGGACTACGATGCCCTCCCCCTGGACGACCCA	
AGACCTTCGCCCTCCTCTCCCGGGGGGAGACCAAGGGGGT	
CTTCCAGCTGGAGTCGGGGGGGATGACCGCCACGCTCCGC	2040
GGCCTCAAGCCGCGGCGCTTTGAGGACCTGATCGCCATCC	
TCTCCCTCTACCGCCCCGGGCCCATGGAGCACATCCCCAC	
CTACATCCGCCGCCACCACGGGCTGGAGCCCGTGAGCTAC	2160
AGCGAGTTTCCCCACGCCGAGAAGTACCTAAAGCCCATCC	
TGGACGAGACCTACGGCATCCCCGTCTACCAGGAGCAGAT	
CATGCAGATCGCCTCGGCCGTGGCGGGGTACTCCCTGGGC	2280
GAGGCGGACCTCCTGCGGCGGTCCATGGGCAAGAAGAAGG	
TGGAGGAGATGAAGTCCACCGGGAGCGCTTCGTCCAGGG	
GGCCAAGGAAAGGGCGTGCCCGAGGAGGAGGCCAACCGC	2400
CTCTTTGACATGCTGGAGGCCTTCGCCAACTACGGCTTCA	
ACAAATCCCACGCTGCCGCCTACAGCCTCCTCTCCTACCA	
GACCGCCTACGTGAAGGCCCACTACCCCGTGGAGTTCATG	2520
GCCGCCCTCCTCTCCGTGGAGCGGCACGACTCCGACAAGG	
TGGCCGAGTACATCCGCGACGCCCGGGCCATGGGCATAGA	
GGTCCTTCCCCCGGACGTCAACCGCTCCGGGTTTGACTTC	2640
CTGGTCCAGGGCCGGCAGATCCTTTTCGGCCTCTCCGCGG	
TGAAGAACGTGGGCGAGGCGGCGGCGGAGGCCATTCTCCG	
GGAGCGGGAGCGGGGCGGCCCTACCGGAGCCTCGGCGAC	2760
TTCTCAAGCGGTGGACGAGAAGGTGCTCAACAAGCGGA	
CCCTGGAGTCCCTCATCAAGGCGGGCGCCCTGGACGGCTT	
CGGGGAAAGGGCGCGGCTCCTCGCCTCCCTGGAAGGGCTC	2880
CTCAAGTGGGCGGCCGAGAACC GGAGAGGCCCGCTCGG	
GCATGATGGGCCTCTTCAGCGAAGTGGAGGAGCCGCCTTT	
GGCCGAGGCGGCCCCCCCTGGACGAGATCACCGGCTCCGC	3000
TACGAGAAGGAGGCCCTGGGGATCTACGTCTCCGGCCACC	
CCATCTTGCGGTACCCCGGGCTCCGGGAGACGGCCACCTG	
CACCCTGGAGGAGCTTCCCCACCTGGCCCCGGGACCTGCCG	3120
CCCCGGTCTAGGGTCTCCTTGCCGGGATGGTGGAGGAGG	
TGGTGCGCAAGCCACAAAGAGCGGCGGGATGATGGCCCG	
CTTCGTCCTCTCCGACGAGACGGGGGCGCTTGAGGCGGTG	3240
GCATTTCGGCCGGGCCTACGACCAGGTCTCCCCGAGGCTCA	
AGGAGGACACCCCCGTGCTCGTCCTCGCCGAGGTGGAGCG	
GGAGGAGGGGGCGTGCGGGTGCTGGCCCAGGCCGTTTGG	3360
ACCTACGAGGAGCTGGAGCAGGTCCCCCGGGCCCTCGAGG	
TGGAGGTGGAGGCCTCCCTCCTGGACGACCGGGGGGTGGC	
CCACCTGAAAAGCCTCCTGGACGAGCACGCGGGGACCCTC	3480
CCCCTGTACGTCCGGGTCCAGGGCGCCTTCGGCGAGGCCC	
TCCTCGCCCTGAGGGAGGTGCGGGTGGGGGAGGAGGCTGT	
AGGCGGCCCGCGTGGTTCCGGGCCTACCTCCTGCCCCGACCG	3600
GGAGGTCCTTCTCCAGGGCGGCCAGGCGGGGGAGGCCAG	
GAGGCGGTGCCCTTCTAGGGGGTGGGCCGTGAGACCTAGC	
GCCATCGTTCTCGCCGGGGGCAAGGAGGCCTGGGCCCGAC	3720
CCCTTTTGG	

FIG. 16B

MGRELRF AHLHQHTQFSLLDGAPKLSDLLKWVEETTPEDP	
ALAMTDHGNLFGAVEFYKKATEMGIKPI LGYEAYVAAESR	
FDRKR GKGLDGGYFHLTLLAKDFTGYQNLVRLASRAYLEG	120
FYEKPRIDREILREHAEGLI ALSGCLGAEIPQFILQDRLD	
LAEARLNEYLSIFKDRFFIEIQNHGLPEQKKVNEVLKEFA	
RKYGLGMVATNDGHYVRKEDARAHEVLLAIQSKSTLDDPG	240
ALALPCEEFYVKTPEEMRAMFP EEEVGGRSPLTTPWRS PH	
VQRGAAIGTRWSTRI PRFPLPEGRTEAQYLMELTFKGLLR	
RYPDRITEGFYREVFR LSGKLPPHGDGEALAEALAQVERE	360
AWERLMKSLPPLAGVKEWTAEAI FHRALYELSAIERMGFP	
GLLPHRPGLLHQLGPEKGVSVGPGRGGAAGSLVAYAVGITN	
IDPLRFGLLFEFLNPERVSM PDIDTDFSDRERDRVIQYV	480
RERYGEDKVAQIGTLGSLASKAALKEVARVYGI PRKKAEE	
LAKLIPVQFGKPKPLQEAIQVVP ELRAEMEKDPKVREVLE	
VAMRLEGLNRHASVHAGRGGVFSEPLTDLVPLCATRKGGP	600
YTQYDMGAVEALGLLKMDFLGLRTL TFLDEVKRIVKASQG	
VELDYDALPLDDPKTFALLSRGETKG VFOLESGGMTATLR	
GLKPRRFEDLIAILSLYRPGMEHIPTYIRRHHGLEPVS Y	720
SEFPHAEKYLKPILDETYGIPVYQE QIMQIASAVAGYSLG	
EADLLRRSMGKKKVEEMKSHRERFVQGA KERGVP EEEANR	
LFDMLEAFANYGFNKSHAAAYSLLSYQTAYVKAHYPVEFM	840
AALLSVERHDSKVAEYIRDARAMGIEVLPPDVNRSGFDF	
LVQGRQILFGLSAVKNVGEAAAEAILRERERGGPYRSLGD	
FLKRLDEKVLNKR TLES LIKAGALDGFGERARLLASLEGL	960
LKWAAENREKARSGMMGLFSEVEEPPLAEAAPLDEITRLR	
YEKEALGIYVSGHPILRYPGLRETATCTLEELPHLARDLP	
PRSRVLLAGMV EEVVRKPTKSGGMARFVLSDETGALEAV	1080
AFGRAYDQVSPRLKEDTPVLVLAEVEREEGGVRVLAQAVW	
TYQELEQVPRALEVEVEASLPDDRGV AHLKSL LDEHAGTL	
PLYVRVQAFGEALLALREVRVGE EALGALEAAGFPAYLL	1200
PNREVS PRLTGSGGPRGRALSTGLALKTYPIALPGGNEAL	
ARPLL	

FIG. 16C

	Start1	Start2	3'-Exo I
T.th.	VERVVRTLLDGRFLL	EEGVGLWEWRYPP	PLEGEAVVLDLLETTGLAG-----LDEVIEVGLLRLEGG---RRLPF
D.rad.			PWQDVVVFDDLETTGFSPA-----SAAIVEIGAVRIVGGQIDETLKF
Bac.sub.	HGIKMIYMEANLVDDG	VPPIAYNAHRLL	EEETYYVVFVDTTGLSAV-----YDTIIELAAVKVGGE--IIDKF
H.inf.			MINPNRQIVLDTFETTGMMNQLGAHYEGHCHIEIGAVELINRR-YTGNNX
E.c.			MSTAITRQIVLDTFETTGMMNQIGAHSEGHKIIIEIGAVEVNNRR-LTGNNF
H.pyl.	NLEYLKACGLNF	IETSENLTITLKNLKTPLK	DEVFSFIDLETTGSCPI-----KHEILEIGAVQVKGE--IINRF

	3'-Exo II
T.th.	QSLVR-PLPP---AEARSWNLT---GIPREALEEAPSLEEVLEKAYPLRGD
D.rad.	ETLVR-PTRPDGMSLIPWQAQRVHG
Bac.sub.	EAFAN-PHRP---LSATIIELT---GITDDMLQDAPDVVDVIRDFREWI
H.inf.	HIYIK-PDRP---XDPDAIKVH---GITDEMLADKPEFKEVAQDFLDYINGAEL
E.c.	HVYLK-DRLV---DPEAFGVH---GIAVDFLLDKPTFAEVAVEFMDYIRGAEL
H.pyl.	ETLVKVSVP-----DYIAELT---GITYEDTLNAPSAHEALQELRLFLGNSV

	3'-Exo IIIC
T.th.	-----YRLENPVVDSLRLARRGLPGLRRYGLDALSEVLELPRRT--CHRALEDVERTLAVVHEVYYMLT-----SG
D.rad.	-----LSWAPERELCTMQLSRRAFP
Bac.sub.	E----VEKAKNPVIDTLELGRFLYPEFKNHRLNTLCKKFDIELTQ--HHRAIYDTEATAYLLKMLKDAA-----EK
H.inf.	-LNVKTDDICLVTDTLQMARQMPGKRN-NLDALCDRLGIDNSKRTLHGALLDAEILADVLYLMMTGGQTNLFDEEE
E.c.	RDIAKTNTFCKVTDLSLAVARKMFPGKRN-SLDALCARYEIDNSKRTLHGALLDAQILA
H.pyl.	-----CPLNLNKLCTDLSKRAILSMRY-SLSFLKELLGFGIEV--SHRAYADALASYKLF

FIG.17



## FIG.18A

ATGGTGGAGCGGGTGGTGCGGACCCTTCTGGACGGGAGGT 40  
TCCTCCTGGAGGAGGGGGTGGGGCTTTGGGAGTGGCGCTA  
CCCCTTTCCCCTGGAGGGGGAGGCGGTGGTGGTCCTGGAC 120  
CTGGAGACCACGGGGCTTGCCGGCCTGGACGAGGTGATTG  
AGGTGGGCCTCCTCCGCCTGGAGGGGGGGAGGCGCCTCCC 200  
CTTCCAGAGCCTCGTCCGGCCCCTCCCGCCCGCCGAAGCC  
CGTTCGTGGAACCTCACCGGCATCCCCCGGGAGGCCCTGG 280  
AGGAGGCCCCCTCCCTGGAGGAGGTTCTGGAGAAGGCCTA  
CCCCCTCCGCGGCGACGCCACCTTGGTGATCCACAACGCC 360  
GCCTTTGACCTGGGCTTCCTCCGCCCGGCCTTGGAGGGCC  
TGGGCTACCGCCTGGAAAACCCCGTGGTGGACTCCCTGCG 440  
CTTGGCCAGACGGGGCTTACCAGGCCTTAGGCGCTACGGC  
CTGGACGCCCTCTCCGAGGTCTTGGAGCTTCCCCGAAGGA 520  
CCTGCCACCGGGCCCTCGAGGACGTGGAGCGCACCCCTCGC  
CGTGGTGCACGAGGTATACTATATGCTTACGTCCGGCCGT 600  
CCCCGCACGCTTTGGGAACTCGGGAGGTAG

MVERVVRTLDDGRFLLEEGVGLWEWRYPFPLEGEAVVVD 40  
LETTGLAGLDEVIEVGLLRLEGGRRLPFQSLVRPLPPAEA  
RSWNLTGIPREALEEAPSLEEVLEKAYPLRGDATALVIHNA 120  
AFDLGFLRPALEGLGYRLNPVVDLRLARRGLPGLRRYG  
LDALSEVLELPRRTCHRALEDVERTLAVVHEVYYMLTSGR 200  
PRTLWELGRZ

## FIG.18B

# Alignment of dnaA genes.

P.mar.	MLEASWEK	VQSSL--KQNLK--	-----PSYE	TWIRPTEFSG--FKN	GELTLIAPNSFSSAW	LKNYSQTIQETAE-	65
Syn.sp.	MVSCENLWQQ	ALAIL--ATQLTK--	-----PAFD	TWIKASVLIS--LGD	GVATIQVENGFVIAH	LQKSYGPLIMEVLT-	67
B.sut.	MENILDLMNQ	ALAQI--EKLSK--	-----PSFE	TWMSYKAHS--LQG	DTLTITAPNEFARDW	LESRYLHLIADTIY-	67
M.tub.	MTDDPGSGFTTWNA	VWSELNGDPKVDGDP	SSDANLSAPLTPQQR	AWLNLVQPLT--IVE	GFALLSVPSFVQNE	IERHLRAPITDALS-	87
T.th.	MSHEAVWQH	VLEHI--RRSITE--	-----VEFH	TWFERIRPLG--IRD	GVLELAVPTSFALDW	IRRHYAGLIQEGPR-	66
E.coli	MSLSLWQQ	CLARL--QDELPA--	-----TEFS	MWIRPLQAE--LSD	NTLALYAPNRFVLDW	VRDKYLNNINGLLT-	64
T.mar.	MKER	ILQEI--KTRVNR--	-----KSWE	LMFSSFDVKS--IEG	NKVVSFVGNLFKEW	LEKKYYSVLSKAVK-	61
H.pyl.	MDTNNNIEKE	ILALVKQNPVSL--	-----IEYE	NYFSOLKYNPNASKS	DIAFFYAPNQVLCIT	ITAKYGALLKEILSQ	72
P.mar.	EIFG---	EPVTVHVK	VKANAESSDEHYSSA	P-----	---ITPPEASPGSV	DSSGSSLRLSK---	130
Syn.sp.	DLTG---	QEITVKLI	TDGLEPHS---	LIGQ	E---	---SSLPMETTP---	115
B.sut.	ELTG---	EELSIFV	IPQNDVEDEFMPKQ	VKKAVKEDTSDFPQ	N-----	---	119
M.tub.	RRLGH-QIQ	GVRIA	PPATDEADDTTVPPS	ENPATTSPDTTND	EIDDSAAARGDNQHS	WPSYFTEPHNTDSA	176
T.th.	LLGAQ-APR	FELRVV	PGVWQEDIFQPPPS	PPAQAP---	N-----	---	108
E.coli	SFCGADAPQLR	FEVG	TKPVTQTPOAAVTN	VAAPQVAQTQORA	APSTRSGWDNVPAPA	EP---	140
T.mar.	VVLG---	NDATFEIT	YEAFEPHSSYSEPLV	KKRAVLLTP---	N-----	---	106
H.pyl.	NKVG-MHL	AHSVDVR	IEVAPKIQINAQ	SNI	NYKAITS---	---	118
P.mar.	FVVGPNRMAHAAAM	AVAESPGREENPLFI	CGGVGLGKTHLMQAI	GHYRLEIDPGAKVSY	VSTETFTNDLIL--A	IRQDRMQAFDRYR-	217
Syn.sp.	FVVGPTNRMAHAAASL	AVAESPGREENPLFL	CGGVGLGKTHLMQAI	AHYRLEMYPNAKVY	VSTERFTNDLIT--A	IRQDNMEDFRSYR-	202
B.sut.	FVIGSGNRF	AHAASL	AVAEAPAKAYNPLFI	YGGVGLGKTHLMHAI	GHYVIDHNPSAKVY	LSSEKFTNEFIN--S	206
M.tub.	FVIGASNRF	AHAAL	ALAEAPARAYNPLFI	WGESGLGKTHLLHAA	GNYAQLRFGMRVY	VSTEEFTNDFIN--S	263
T.th.	SWMGPTTPWPHGGAV	AVAESPGRAYNPLFI	YGGRGLGKTYLMHAV	GPLRAKRFPHMRLEY	VSTETFTNELINRPS	AR-DRMTEFRERYR-	196
E.coli	FVEGKSNQLARAAAR	QVADNPGGAYNPLFL	YGGTGLGKTHLLHAV	GNGIMARKPNKVVY	MHSEFVQDMVK--A	LQNNALFEFKRYR-	227
T.mar.	FVVGPGNSFAYHAAL	EVAKHPRG-YNPLFI	YGGVGLGKTHLLQSI	GNYVVQNEPDLRMVY	ITSEKFLNDLVD--S	MGEGLINEFREKYRK	193
H.pyl.	FVVGSCNNTVYEIAK	KVAQSDTPPNFVLF	YGGTGLGKTHLLNAI	GNHALEK--HKKVVL	VTSEDFLTDFLK--H	LDNKTMDSFKAKYR-	203

FIG.19A

P.mar. AADLILVDDIQFIEG KEYTQEEFFHTFNAL HDAGSQIVLASDRPP SQIPRLQERLMSRFS MGLIADVQAPDLETR MAILQKKAHERVGL 307  
 Syn.sp. SADFLILDDIQFIKG KEYTQEEFFHTFNAL HEAGKQVWASDRAP QRIPGLQDRLISRFS MGLIADIQVPDLETR MAILQKKAEDRIRL 292  
 B.sut. NVDVLLIDDIQFIAG KEQTQEEFFHTFNAL HEESKQIVISSDRPP KEIPTLEDRLRSRFE WGLITDITPPDLETR IAILRKKAKAEGLDI 296  
 M.tub. DVDVLLVDDIQFIEG KEGIQEEFFHTFNAL HNANKQIVISSDRPP KQIATLEDRLRTRFE WGLITDVQPPPELETR IAILRKKAKAOMERLAV 353  
 T.th. SVDLILLVDDVQFIAG KERTQEEFFHTFNAL YEAHKQIILSSDRPP KDILITLEARLSRFE WGLITDNAPDLETR IAILKKNAS-SGPED 285  
 E.coli. SVDALLIDDIQFFAN KERSQEEFFHTFNAL LEGNQOIILTSDRYP KEINGVEDRLKSRFG WGLTVAJEPPPELETR VAILMKKADENDIRL 317  
 T.mar. KVDILLIDDVQFLIG KTGVTQTELFHTFNEL HDGKQIVICSDREP QKLSEFQDRLVSRFQ MGLVAKLEPPDEETR KSIARKMLEIEHGEL 283  
 H.pyl. HCDFFLLDDAQFLOG KPKEEEFFHTFNEL HANSKQIVLISDRSP KNLAGLEDRLKSRFE WGITAKVMPDLETK LSIVKQKQCLNQITL 293

P.mar. PRDLIQFIAGRFTSN ILEGALTRAIAFA SITGLPMTVDSIAPM LD-----PNGQGVET PKQVLDKVAEVFKVT PDEMRSASRRR-PVS 392  
 Syn.sp. PKEVIEYIASHYTSN ILEGALIRALAYT SLSNVAMTVENIAPV LN-----PPVEKVAAP PETIITIVAQHYQLK VEELLSNSRRR-EVS 377  
 B.sut. PNEVMLYIANQIDSN ILEGALIRVWAYS SLINKDINADLAEEA LKDII-PSSKPKVIT IKEIQRVVGQQFNIK LEDFKAKKRTK-SVA 384  
 M.tub. PDDVLELIASSIERN ILEGALIRVTAPA SLAKTPIDKALAEIV LRDLI-ADANTMOIS AATIMAATAEYFDIT VEELRGPGKTR-ALA 441  
 T.th. PEDALEYIARQVTSN IREWEGALMRASPPA SLANGVELTRAVAKA LRHLR-P---RELEAD PLEIIRKAAAGPVRPE TPGGAHGERRKKEVV 372  
 E.coli. PGEVAFFIAKRLSN VRELEGALNRVIANA NFGTGRAITIDFVREA LRDLI-A-LQEKLV ITDNIQKTVAEYTKIK VADLLSKRRSR-SVA 404  
 T.mar. PEEVLNFAENVDDN LRRLRGAIKILVYK ETTGKEVDLKEAILL LKDFIKPNRVKAMD P IDELIEIVAKVTGVP REEILSNSRNV-KAL 372  
 H.pyl. PEEVMEYIAQHISDN IRQMEGAIKISVNA NLMNASIDILNAKTIV LEDL---QKDHAEGBSS LENILLAVAQSLNLK SSEIKVSSRQK-NVA 380

P.mar. QARQVGMVLMRQGTN LSLPRIGDTFGGKDH TTVMYAIEQVEKKLS S-----DPQIA SQVQKIRDLQIDSR RKR----- 461  
 Syn.sp. LARQVGMVLMRQHTD LSLPRIGEAFGGKDH TTVMYSCDKITQLQ K-----DWETS QTLTSLSHRINIAGQ APES--- 447  
 B.sut. FPRQIAMVLSREMTD SSLPKIGEEFGGRDH TTVIHAHEKISKLLA D-----DEQLQ QHVKEIKEQLK----- 446  
 M.tub. QSRQIAMVLCRELTD LSLPKIGQAFG-RDH TTVMYAQRKILSEMA E-----RREVF DHVKELTTRIRORSK R----- 507  
 T.th. LPRQIAMVLRLETP ASLPEIGQLFGGRDH TTVRVAIQKVQELAG KP-----DREVQ GLRRTIReactDPVD NLWITCG 446  
 E.coli. RPRQAMALAKELTN HSLPEIGDAFGGRDH TTVLHACRKIEQLRE E-----SHDIK EDFSNLIRTLSS--- 467  
 T.mar. TARRIGMYVAKNYLK SSLRTIAEKN-RSH FVVVDSVKVKDSSL KG-----NKQLK ALIDEVIGEISRRAL SG----- 440  
 H.pyl. LARKLVVYFARLYTP NPTLSLAQFLDLKDH SSISKMYSGVKKMLE EEKSPFVLSLREEIK NRLNELNDKKTAFNS SE----- 457

FIG.19B

GTGTCGCACGAGGCCGTCTGGCAACACGTTCTGGAGCA<sup>CA</sup>  
 TCCGCCGCAGCATCACCGAGGTGGAGTTCCACACCTGGTT  
 TGAAAGGATCCGCCCCCTTGGGGATCCGGGACGGGGTGCTG 120  
 GAGCTCGCCGTGCCACCTCCTTTGCCCTGGACTGGATCC  
 GCGGCCACTACGCCGGCCTCATCCAGGAGGGCCCTCGGCT  
 CCTCGGGGGCCAGGCGCCCCGGTTTGAGCTCCGGGTGGTG 240  
 CCCGGGGTCTAGTCCAGGAGGACATCTTCCAGCCCCCGC  
 CGAGCCCCCGGCCAAGCTCAACCCGAAGATACCTTTAA  
 AACTTCGTGGTGGGGCCCCAACAACCTCCATGGCCCCACGGC 360  
 GCGCCGTGGCCGTGGCCGAGTCCCCCGGCCGGGCCTACA  
 ACCCCCTCTTCATCTACGGGGGCCGTGGCCTGGGAAAGAC  
 CTACCTGATGCACGCCGTGGGCCACTCCGTGCGAAGCGC 480  
 TTCCCCCACATGAGATTAGAGTACGTTTCCACGGAAACTT  
 TCACCAACGAGCTCATCAACCGGCCATCCGCGAGGGACCG  
 - GATGACGGAGTTCCGGGAGCGGTACCGCTCCGTGGACCTC 600  
 CTGCTGGTGGACGACGTCCAGTTCATCGCCGGAAGGAGC  
 GCACCCAGGAGGAGTTTTTCCACACCTTCAACGCCCTTTA  
 CGAGGCCCAACAAGCAGATCATCCTCTCCTCCGACCGGCCG 720  
 CCCAAGGACATCCTCACCTTGGAGGCGCGCCTGCGGAGCC  
 GCTTTGAGTGGGGCCTGATACCGACAATCCAGCCCCCGA  
 CCTGGAAACCCGGATCGCCATCCTGAAGATGAACGCCAGC 840  
 AGCGGGCCTGAGGATCCCGAGGACGCCCTGGAGTACATCG  
 CCCGGCAGGTCACCTCCAACATCCGGGAGTGGAAGGGGC  
 CCTCATGCGGGCATCGCCTTTCGCCTCCCTCAACGGCGTT 960  
 GAGCTGACCCGCGCCGTGGCGGCCAAGGCTCTCCGACATC  
 TTCGCCCCAGGGAGCTGGAGGCGGACCCCTTGGAGATCAT  
 CCGCAAAGCGGCGGGACCAAGTTTCGGCCTGAAACCCCGGGA 1080  
 GGAGCTCACGGGGAGCGCCGCAAGAAGGAGGTGGTCCTCC  
 CCCGGCAGCTCGCCATGTACCTGGTGCGGGAGCTCACCCC  
 GGCCTCCCTGCCCGAGATCGACCAGCTCAACGACGACCGG 1200  
 GACCACACCACGGTCCTCTACGCCATCCAGAAGGTCCAGG  
 AGCTCGCGGAAAGCGACCGGGAGGTGCAGGGCCTCCTCCG  
 CACCCTCCGGGAGGCGTGCACATGA

FIG.20A

VSHEAVWQHVLHIRRSITEVEFHTWFERIRPLGIRDGVL  
ELAVPTSFALDWIRRHYAGLIQEGPRLPGAQAPRFELRVV  
PGVVQEDIFQPPSPPAQAQPEDTFKTSWWGPTTPWPHG 120  
GAVAVAESPGRAYNPLFIYGGRGLGKTYLMHAVGPLRAKR  
FPHMRLEYVSTETFTNELINRPSARDRMTEFRERYRSVDL  
LLVDDVQFIAGKERTQEEFFHTFNALYEAHKQIILSSDRP 240  
PKDILTLEARLRSRFEWGLITDNPAPDLETRIAILKMNAS  
SGPEDPEDALEYIARQVTSNIREWEGALMRASPFASLNGV  
ELTRAVAAKALRHLRPRELEADPLEIIRKAAGPVRPETPG 360  
GAHGERRKKEVVLPRQLAMYLVRELTPASLPEIDQLNDDR  
DHTTVLYAIIQKVQELAESDREVQGLLRTLREACT

FIG.20B

ATGAACATAACGGTTCCCAAAAACTCCTCTCGGACCAGC 40  
 TTTCCCTCCTGGAGCGCATCGTCCCCCTCTAGAAGCGCCAA  
 CCCCCTCTACACCTACCTGGGGCTTTACGCCGAGGAAGGG 120  
 GCCTTGATCCTCTTCGGGACCAACGGGGAGGTGGACCTCG  
 AGGTCCGCCTCCCCGCCGAGGCCCAAAGCCTTCCCCGGGT 200  
 GCTCGTCCCCGCCAGCCCTTCTTCCAGCTGGTGCGGAGC  
 CTTCTTGGGGACCTCGTGGCCCTCGGCCTCGCCTCGGAGC 280  
 CGGGCCAGGGGGGGGAGCTGGAGCTCTCCTCCGGGCGTTT  
 CCGCACCCGGCTCAGCCTGGCCCTGCCGAGGGCTACCCC 360  
 GAGCTTCTGGTGCCCGAGGGGGAGGACAAGGGGGCCTTCC  
 CCTCCGGACGCGGATGCCCTCCGGGGAGCTCGTCAAGGC 440  
 CTTGACCCACGTGCGCTACGCCGCGAGCAACGAGGAGTAC  
 CGGGCCATCTTCCGCGGGGTGCAGCTGGAGTTCTCCCCC 520  
 AGGGCTTCCGGGCGGTGGCCTCCGACGGGTACCGCCTCGC  
 CCTCTACGACCTGCCCCCTGCCCAAGGGTTCCAGGCCAAG 600  
 GCCGTGGTCCCCGCCCGGAGCGTGGACGAGATGGTGCGGG  
 TCCTGAAGGGGGCGGACGGGGCCGAGGCCGTCTCGCCCT 680  
 GGGCGAGGGGGTGTTGGCCCTGGCCCTCGAGGGCGGAAGC  
 GGGGTCCGGATGGCCCTCCGCCTCATGGAAGGGGAGTTCC 760  
 CCGACTACCAGAGGGTTCATCCCCCAGGAGTTCGCCCTCAA  
 GGTCCAGGTGGAGGGGGAGGCCCTCAGGGAGGCGGTGCGC 840  
 CGGGTGAGCGTCCTCTCCGACCGGCAGAACCACCGGGTGG  
 ACCTCCTTTTGGAGGAAGGCCGGATCCTCCTCTCCGCCGA 920  
 GGGGACTACGGCAAGGGGCAGGAGGAGGTGCCCGCCCAG  
 GTGGAGGGGGCCGGACATGGCCGTGGCCTACAACGCCCGCT 1000  
 ACCTCCTCGAGGCCCTCGCCCCCGTGGGGGACCGGGCCCA  
 CCTGGGCATCTCCGGGCCCCACGAGCCCGAGCCTCATCTGG 1080  
 GGGGACGGGGAGGGGTACCGGGCGGTGGTGGTGCCCCTCA  
 GGGTCTAG 1128

FIG.21A

MNITVPKKLLSDQLSLLERIVPSRSANPLYTYLGLYAEEG 40  
ALILFGTNGEVDLEVRLPAEAQSLPRVLVPAQPFFQLVRS  
LPGDLVALGLASEPGQGGQLELSSGRFRTLAPAEGLYP 120  
- ELLVPEGEDKGAFPLRTRMPSGELVKALTHVRYAASNEEY  
RAIFRGVQLEFSPQGFRAVASDGYRLALYDLPLPQGFQAK 200  
AVVPARSVDEMVRVLKGADGAEAVLALGEGVLALALEGGS  
GVRMALRLMEGEFPDYQRVIPQEFALKVQVEGEALREAVR 280  
RVSVLSDRQNHVRVDLLLEEGRILLSAEGDYGKGQEEVPAQ  
VEGPDMAVAYNARYLLEALAPVGDRHLGISGPTSPSLIW 360  
GDGEGYRAVVVPLRVZ

FIG.21B

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

MNITVPKLLSDQLSLLERTVPSRSANPLYTYLGLYAEAGALLFGTNGEVDLEVRPLPAE  
MKFTVEREHLKPLQOVSGPLGGRPTLPILGNLLQVADGTLSTAGTDLEMEMVARVALV  
MKFIIEREQLKPLQOVSGPLGGRPTLPILGNLLKVTENTLSLTGTDLEMEMMARVSL  
MQFSISRENILKPLQOVCGVLSNRNIPVIANVLLQIEDYRLTITGTDLEVELSSQTQLS  
MHFTIQREALKPLQLVAGVVERRQTLFVLSNVLLVVGQQQLSLTGTDLLEVELVGRVQLE  
MKFTIQNDILTAKLKKITRVLVKNLSFPILENILIQVEDGTLSTTNLEIELISKIEII  
\* \* \* \* \*

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

AQSLP-RVLVPAQFFQVLVRSPLPGDLVALGLASEPGQGQLELSSGRFRTRLSLAPAEGY  
QPHEPGATTVPARKFFDICRGLP-EGAEIAVQLE---GERMLVRSGRSRFSLSTLPAADF  
QSHEIGATTVPARKFFDIWRGLP-EGAEISVELD---GDRLLVRSGRSRFSLSTLPASDF  
SSSENGFTTIPAKKFLDICRTLS-DDSEITVTFE---QDRALVQSGRSRFTLATQPAEEY  
EPAEPGEITVPARKLMDICKSLP-NDALIDIKVD---EQKLLVKAGRSRFTLSTLPANDF  
TKYIPGKTTISGRKILNICRTLS-EKSKIKMLK---NKKMYISSENSNYILSTLSADTF  
\* \* \* \* \*

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

PELLVPEGEDKGAFFLTRMPSGELVKALTHVRYAASNEEVRAIFRGVQLEFSPQGFRAV  
PNLDD--WQSEVEFTLPQAT---MKRLIEATQFSMAHQDVRYVYINGMLFETEGEELRTV  
PNLDD--WQSEVEFTLPQAT---LKRLIESTQFSMAHQDVRYVYINGMLFETENTELRTV  
PNLTD--WQSEVDFELPONT---LRRLIEATQFSMANQDARYFINGMLFETEGNLLRTV  
PTVEE--GPGSLTCNLEQSK---LRRLIERTSFAMAQQDVRYVYINGMLLEVSRTILRAV  
PNHQN--FDYISKFDISSNI---LKEMIEKTEFSMGKQDVRYVYINGMLLEKKDKFLRSV  
\* \* \* \* \*

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

ASDGYRLALYDLPLPQGFQA--KAVVPARSVDENVRLKGDGAEAVLAGEVLALALE  
ATDGHRLAVCSMPIGQSPLPS-HSVIVPRKGVIELMRMLDG-GDNPLRVQIGSNIRAHVG  
ATDGHRLAVCAMDIGQSLPG-HSVIVPRKGVIELMRLLDGSGESLLQIQGNNLRAHVG  
ATDGHRLAVCTISLEQELQN-HSVILPRKGVLELVRLEET-NDEPARLQIGTNNLRVHLK  
STDGHRLALC SMSAPIEQEDRHQVIVPRKGILELARLLTD-PEGMVSIVLGQHHIRATTG  
ATDGYRLAISYTQKKDINF-FSIIIPNKAVMELLKLANT-QPQLNILIGSNSIRIYTK  
\* \* \* \* \*

FIG. 22A



T.th.beta	GGSGVRMALRLMEGEFPDYQORVIPOEFALKVQVEGEALREAVRRVSVLSDRQNHVRVDLLL
E.coli.bet	---DFIFTSKLVNDRFPDYRRVLPKNPKHLEAGCDLLKQAFARAAAILSNEKFRGVRLYV
P.mirab.be	---DFIFTSKLVNDRFPDYRRVLPKNPTKTIVLAGCDILKQAFSRAAILSNEKFRGVRINL
H.infl.bet	---NTVFTSKLIDGRFPDYRRVLPKNATKIVEGNWEMLKQAFARASILSNERARSVRLSL
P.put.beta	---EFTFTSKLVNDRFPDYRRVLPKGGDKLVWGDROALREAFSRTAILSNEKYRGIRLQL
B.cap.beta	---NLFTTQVLEGEYDPYKSVLFKEKNPIITNSILKKSLLRVAILLAHEKFCGIEIKI

\* \* \* \* \*

T.th.beta	EEGRILLSAEGDYGK-GQEEVPAQVEGPDMAVAVNARYLLEALAPVG-DRAHLGISGPTS
E.coli.bet	SENQLKITANNPEQEEAEIILDVITYSGAEMEIGFNVSYLDVNLALKCENVRRMLTDSVS
P.mirab.be	TNGQLKITANNPEQEEAEIIVDVYQGEEMEIGFNVSYLDVNLKCEVKLLLTDAVS
H.infl.bet	KENQLKITASNTHEEAEIIVDVYNGEELEVGFNVTYLDVNLKCNQVRMCLTDAFS
P.put.beta	AAGQLKIQANNPEQEEAEIISVDYEGSSLEIGFNVSYLDVILGVMTEQVRLILSDSNS
B.cap.beta	ENGKFKVLSDNQEEETAEDLFEIDYFGEKIEISINVYLLDVINNKSENIALFLNKSXS

\* \* \* \* \*

T.th.beta	PSLWGDG-EGYRAVVVPLRVZ	(ID#108)
E.coli.bet	SVQIEDAASQSAAYVVMPLRZ	(ID#109)
P.mirab.be	SVQVENVASAAAAVVMPLR-	(ID#110)
H.infl.bet	SCLJENCEDSSCEYVIMPLR-	(ID#111)
P.put.beta	SALLQEAGNDSSYVVMPLR-	(ID#112)
B.cap.beta	SIQIEAENSSNAYVVMLKR-	(ID#113)

\* \* \* \* \*

FIG.22B

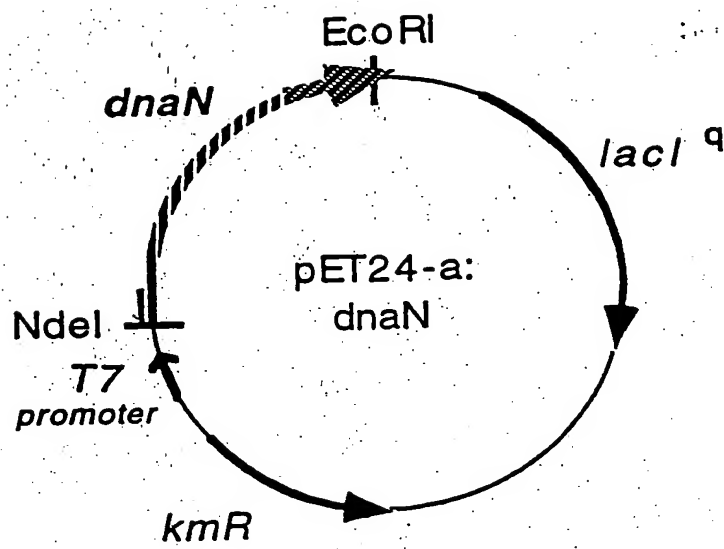


FIG.23

**FIG.24A Induction**



↓  
**Lysis**  
↓  
**Heat Step**  
↓

**FIG.24B MonoQ Column**

Fraction: 5 7 9 11 13 15 17 19 21 23 25

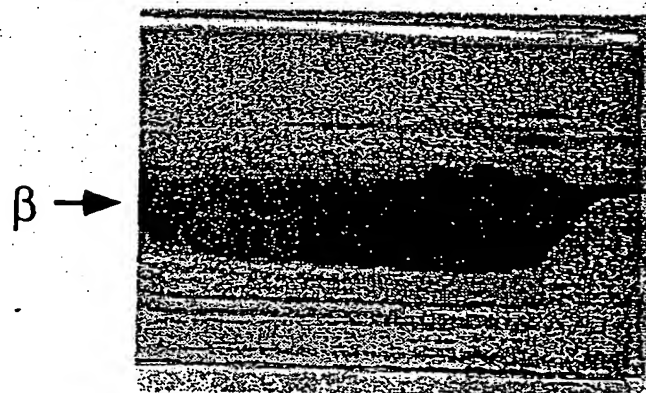


FIG.25A

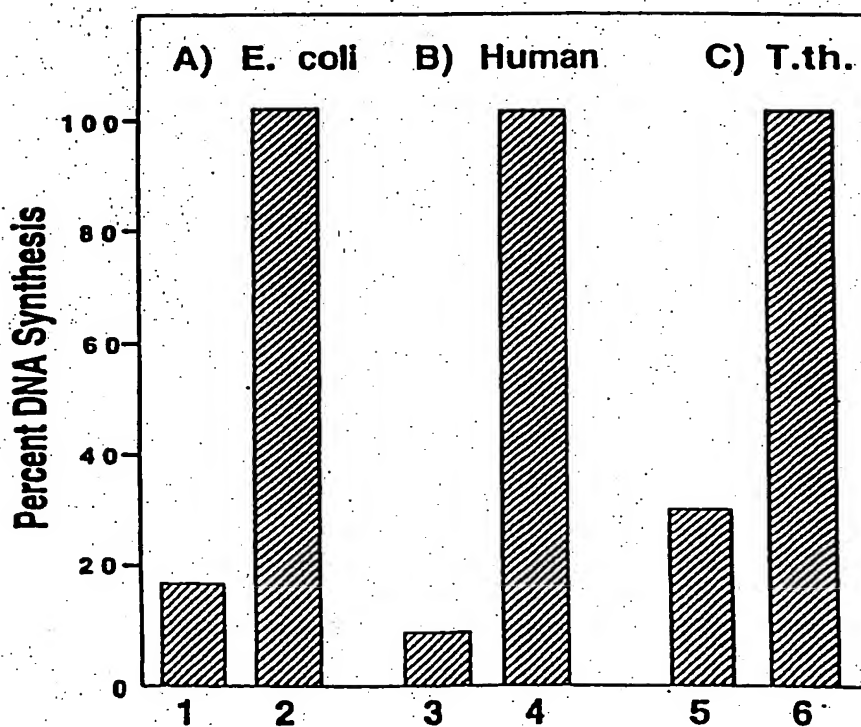
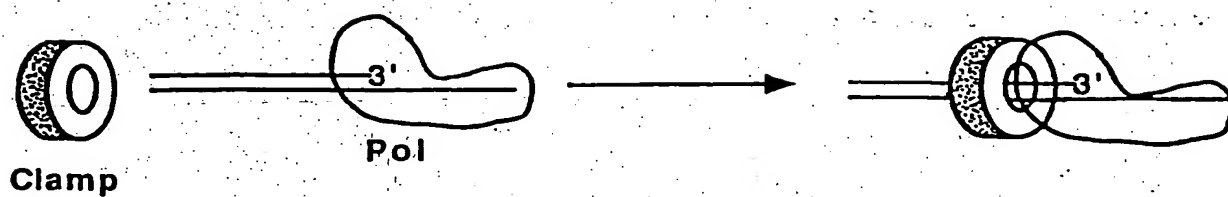


FIG.25B

FIG. 26A

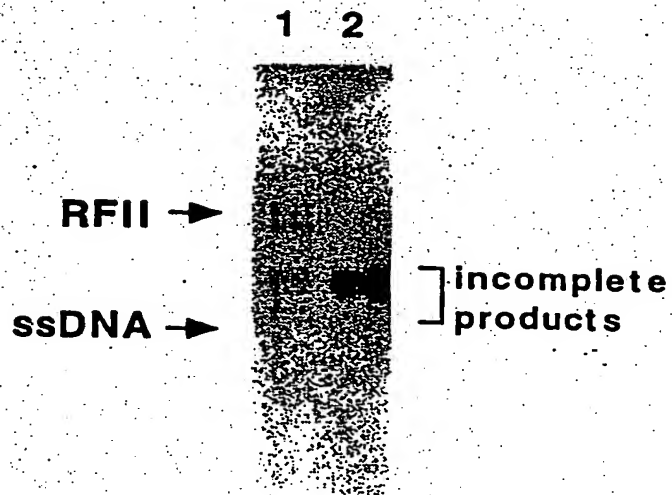
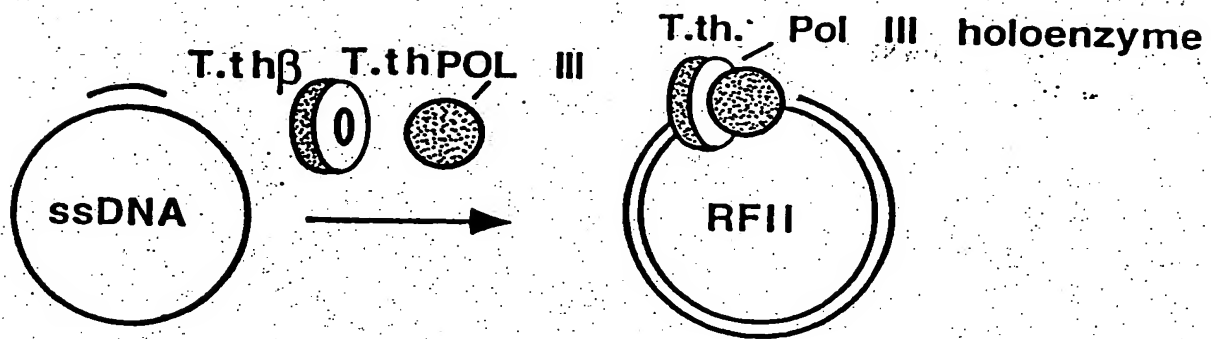


FIG. 26B

$\alpha$        $\tau$        $\delta$        $\delta'$  SSB  $\epsilon$



FIG. 27

2 4 6 8 10 12 14 16 18 20 22 24 26 28 <sup>stds</sup> 30 32 34 36 38 40 42 44 46 48 50 52 54

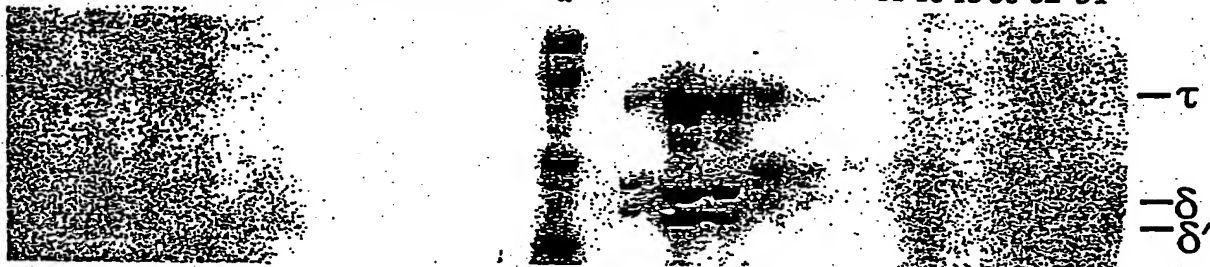


FIG. 28

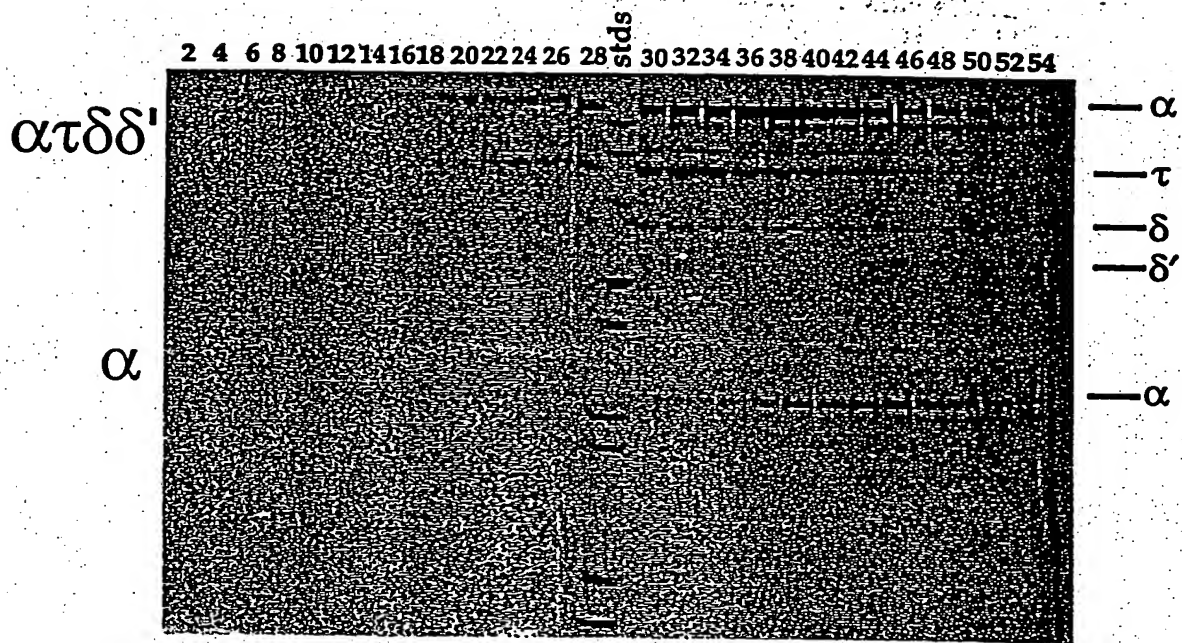


FIG. 29

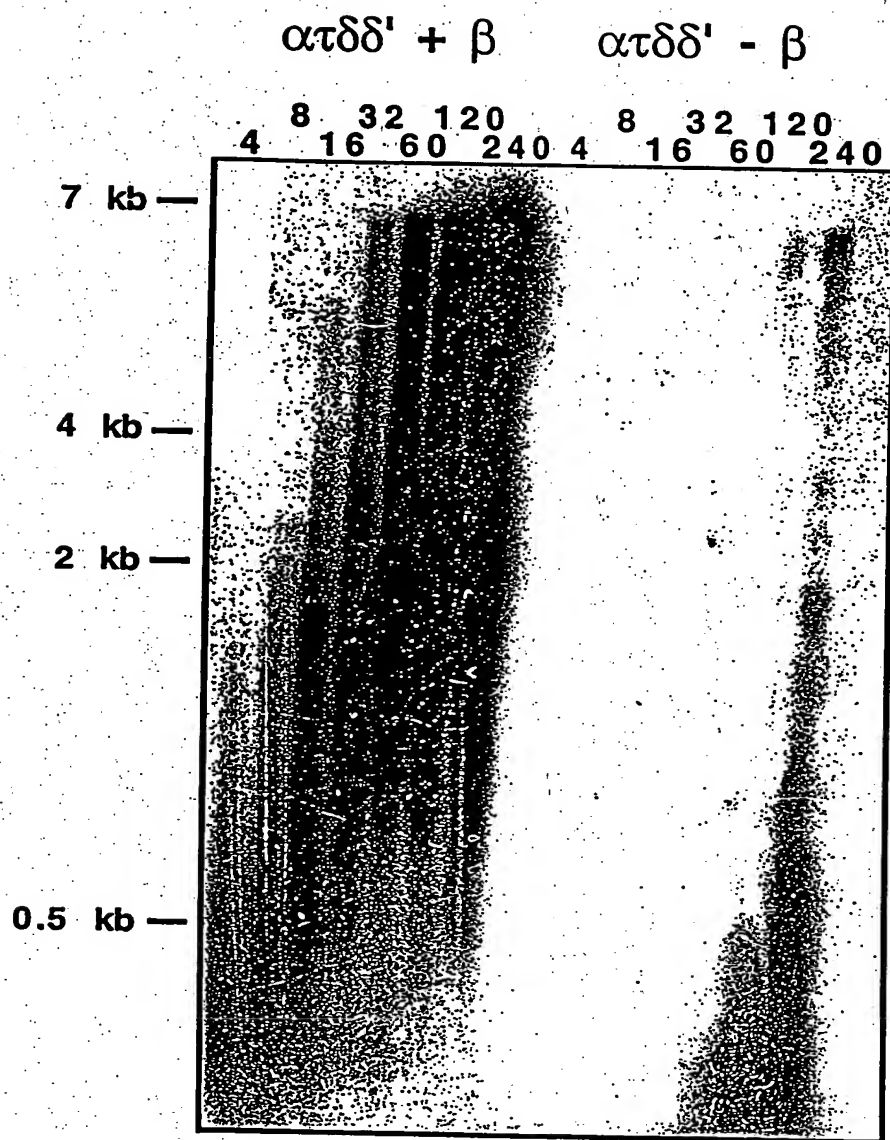


FIG. 30



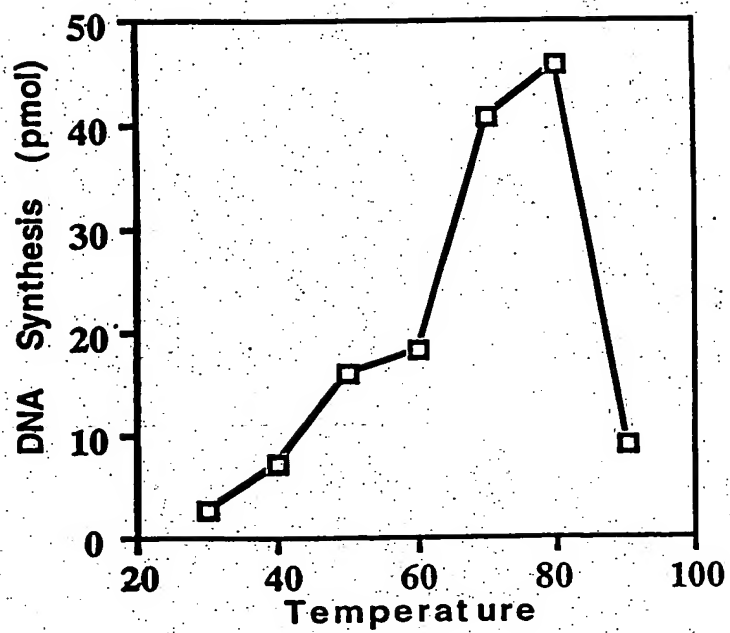


FIG. 31

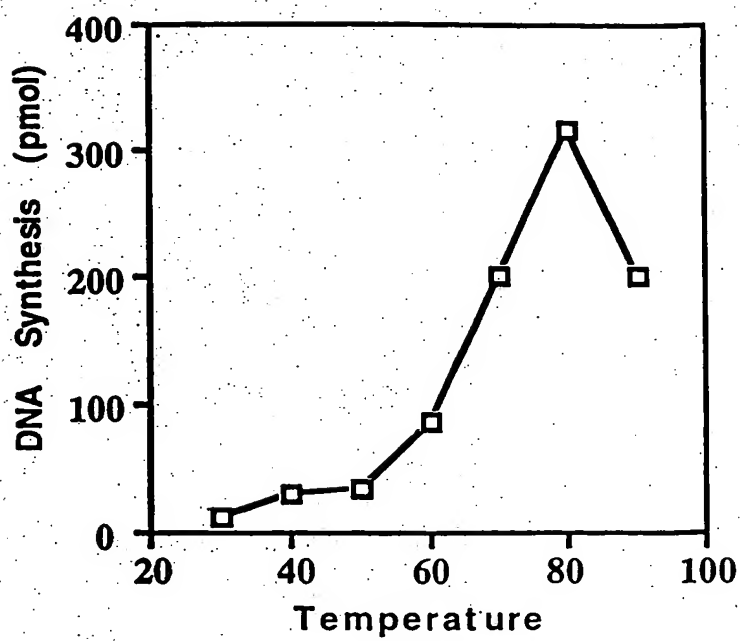
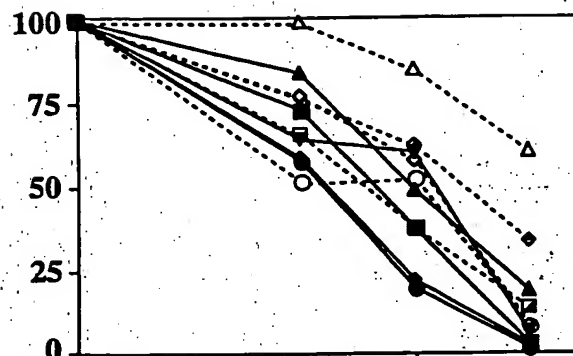
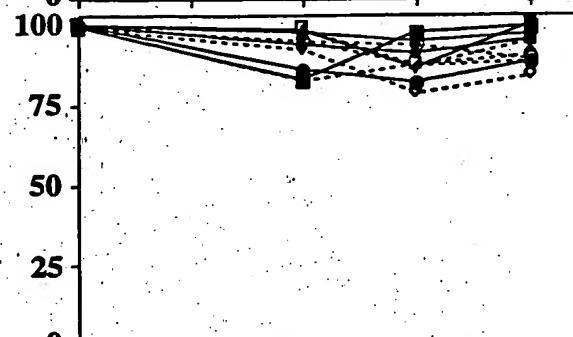
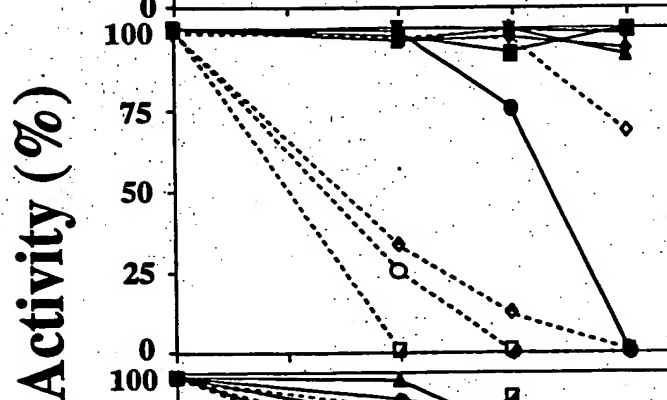
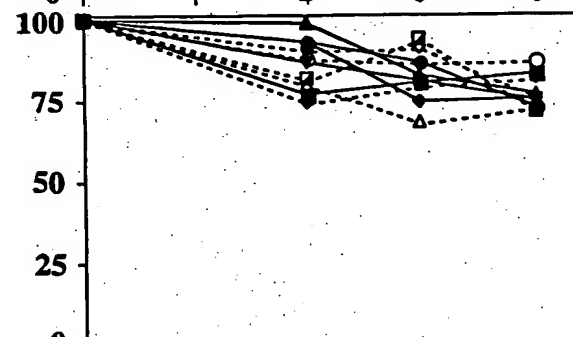


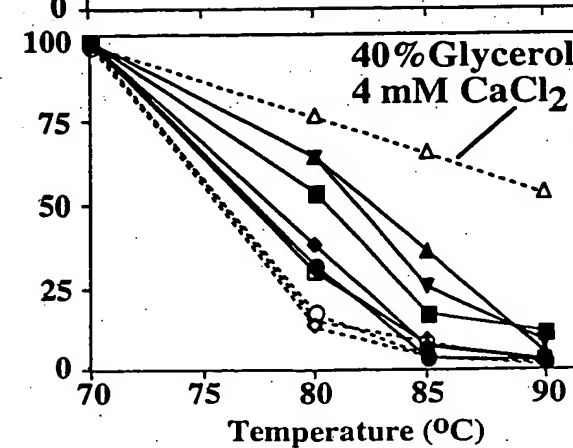
FIG. 32

$\alpha$  $\beta$  $\tau\delta\delta'$ 

SSB



Pol III\*



ATGAGTAAGGATTTTCGTCCACCTTCACCTGCACACCCAGTTCTCACTCCT	
GGACGGGGCTATAAAGATAGACGAGCTCGTGAAAAGGCAAAGGAGTATG	100
GATACAAAGCTGTCGGAATGTCAGACCACGGAAACCTCTTCGGTTCGTAT	
AAATTCTACAAAGCCCTGAAGGCGGAAGGAATTAAGCCCATAATCGGCAT	200
GGAAGCCTACTTTACCACGGGTTCGAGGTTTGACAGAAAGACTAAAACGA	
GCGAGGACAACATAACCGACAAGTACAACCACCACCTCATACTTATAGCA	300
AAGGACGAAAAGGTCTAAAGAACTTAATGAAGCTCTCAACCCTCGCCTAC	
AAAGAAGGTTTTTACTACAAACCCAGAATTGATTACGAACTCCTTGAAAA	400
GTACGGGGAGGGCCTAATAGCCCTTACCGCATGCCTGAAAGGTGTTCCCA	
CCTACTACGCTTCTATAAACGAAGTGAAAAAGGCGGAGGAATGGGTAAAG	500
AAGTTCAAGGATATATTCGGAGATGACCTTTATTTAGAACTTCAAGCGAA	
CAACATTCCAGAACAGGAAGTGGCAAACAGGAACCTTAATAGAGATAGCCA	600
AAAAGTACGATGTGAAACTCATAGCGACGAGGACGCCCCACTACCTCAAT	
CCCGAAGACAGGTACGCCCACACGGTTCCTATGGCACTTCAAATGAAAAA	700
GACCATTACGAACTGAGTTCGGGAAACTTCAAGTGTTCAAACGAAGACC	
TTCACTTTGCTCCACCCGAGTACATGTGGAAAAAGTTTGAAGGTAAGTTC	800
GAAGGCTGGGAAAAGGCACTCCTGAACACTCTCGAGGTAATGGAAAAGAC	
AGCGGACAGCTTTGAGATATTTGAAAACCTCACCTACCTCCTTCCCAAGT	900
ACGACGTTCCGCCCCGACAAAACCCTTGAGGAATACCTCAGAGAACTCGCG	
TACAAAGGTTTAAGACAGAGGATAGAAAGGGGACAAGCTAAGGATACTAA	1000
AGAGTACTGGGAGAGGCTCGAGTACGAACTGGAAGTTATAAACAAAATGG	
GCTTTGCGGGATACTTCTTGATAGTTCAGGACTTCATAAACTGGGCTAAG	1100
AAAAACGACATACCTGTTGGACCCGGAAGGGGAAGTGCTGGAGGTTCCCT	
CGTCGCATACGCCATCGGAATAACGGACGTTGACCCTATAAAGCACGGAT	1200
TCCTTTTTTGAGAGGTTCTTAAACCCCGAAAGGGTTTCCATGCCGGATATA	
GACGTGGATTTCTGTTCAGGACAACAGGGGAAAAGGTCATAGAGTACGTAAG	1300
GAACAAGTACGGACACGACAACGTAGCTCAGATAATCACCTACAACGTAA	
TGAAGGCGAAGCAAACACTGAGAGACGTCGCAAGGGCCATGGGACTCCCC	1400
TACTCCACCGCGGACAAACTCGCAAAACTCATTCTCAGGGGGACGTTCA	
GGGAACGTGGCTCAGTCTGGAAGAGATGTACAAAACGCCTGTGGAGGAAC	1500
TCCTTCAGAAGTACGGAGAACACAGAACGGACATAGAGGACAACGTAAAG	
AAGTTCAGACAGATATGCGAAGAAAGTCCGGAGATAAAACAGCTCGTTGA	1600
GACGGCCCTGAAGCTTGAAGGTCTCACGAGACACACCTCCCTCCACGCCG	
CGGGAGTGGTTATAGCACCAAAGCCCTTGAGCGAGCTCGTTCCCTCTAC	1700
TACGATAAAGAGGGCGAAGTCGCAACCCAGTACGACATGGTTCAGCTCGA	
AGAACTCGGTCTCCTGAAGATGGACTTCCTCGGACTCAAACCCCTCACAG	1800
AACTGAAACTCATGAAAGAACTCATAAAGGAAAGACACGGAGTGATATA	
AACTTCCTTGAACCTTCCCCTTGACGACCCGAAAGTTTACAAACTCCTTCA	1900
GGAAGGAAAAACCACGGGAGTGTTCCAGCTCGAAAGCAGGGGAATGAAAG	
AACTCCTGAAGAACTAAAGCCCGACAGCTTTGACGACATCGTTGCGGTC	2000
CTCGCACTCTACAGACCCGGACCTCTAAAGAGCGGACTCGTTGACACATA	
CATTAAGAGAAAGCACGGAAAAGAACCCTTGAGTACCCCTTCCCGGAGC	2100
TTGAACCCGTCCTTAAGGAAACCTACGGAGTAATCGTTTATCAGGAACAG	
GTGATGAAGATGTCTCAGATACTTTCCGGCTTTACTCCCGGAGAGGCGGA	2200
TACCCTCAGAAAGGCGATAGGTAAGAAGAAAGCGGATTTAATGGCTCAGA	
TGAAAGACAAGTTCATACAGGGAGCGGTGGAAAGGGGATACCCTGAAGAA	2300
AAGATAAGGAAGCTCTGGGAAGACATAGAGAAGTTTCGCTTCTACTCCTT	
CAACAAGTCTCACTCGGTAGCTTACGGGTACATCTCCTACTGGACCGCCT	2400

FIG. 34A

ACGTTAAAGCCCACTATCCCGCGGAGTTCTTCGCGGTAAAACCTCACAAC	2500
GAAAAGAACGACAACAAGTTCCTCAACCTCATAAAAGACGCTAAACTCTT	
CGGATTTGAGATACTTCCCCCGACATAAAACAAGAGTGATGTAGGATTTA	2600
CGATAGAAGGTGAAAACAGGATAAGGTTTCGGGCTTGCGAGGATAAAGGGA	
GTGGGAGAGGAACTGCTAAGATAATCGTTGAAGCTAGAAAGAAGTATAA	2700
GCAGTTCAAAGGGCTTGCGGACTTCATAAACAAAACCAAGAACAGGAAGA	
TAAACAAGAAAGTCGTGGAAGCACTCGTAAAGGCAGGGGCTTTTGACTTT	2800
ACTAAGAAAAAGAGGAAAGAACTACTCGCTAAAGTGGCAAACCTCTGAAAA	
AGCATTAAATGGCTACACAAAACTCCCTTTTCGGTGCACCGAAAGAAGAAG	2900
TGGAAGAACTCGACCCCTTAAAGCTTGAAAAGGAAGTTCTCGGTTTTTAC	
ATTTCAAGGCACCCCTTGACAACTACGAAAAGCTCCTCAAGAACCGCTA	3000
CACACCCATTGAAGATTTAGAAGAGTGGGACAAGGAAAGCGAAGCGGTGC	
TTACAGGAGTTATCACGGAACCTCAAAGTAAAAAAGACGAAAAACGGAGAT	3100
TACATGGCGGTCTTCAACCTCGTTGACAAGACGGGACTAATAGAGTGTGT	
CGTCTTCCCGGGAGTTTACGAAGAGGCAAAGGAACTGATAGAAGAGGACA	3200
GAGTAGTGGTAGTCAAAGGTTTTCTGGACGAGGACCTTGAAACGGAAAAT	
GTCAAGTTCGTGGTGAAAGAGGTTTTCTCCCCTGAGGAGTTCGCAAAGGA	3300
GATGAGGAATACCCTTTATATATTCTTAAAAAGAGAGCAAGCCCTAAACG	
GCGTTGCCGAAAACTAAAGGGAATTATTGAAAACAACAGGACGGAGGAC	3400
GGATACAACTTGTTCTCACGGTTGATCTGGGAGACTACTTCGTTGATTT	
AGCACTCCCACAAGATATGAACTAAAGGCTGACAGAAAGGTTGTAGAGG	3500
AGATAGAAAACTGGGAGTGAAGGTCATAATTTAGTAAATAACCCTTACT	
TCCGAGTAGTCCCC	

**FIG. 34B**

MSKDFVHLHLHTQFSLLDGAIKIDELVKKAKEYGYKAVGMSDHGNLFGSY	100
KFYKALKAEGIKPIIGMEAYFTTGSRFDRKTKTSEDNITDKYNHHLILIA	
KDDKGLKNLMKLSTLAYKEGFYKPRIDYELLEKYGEGLIALTACLKGV	200
TYYASINEVKKAEEWVKKFKDIFGDDLYLELQANNIPEQEVANRNLIEIA	
KKYDVKLIATQDAHYLNPEDRYAHTVLMALQMKKTIHELSSGNFKCSNED	300
LHFAPPEYMWKKFEGKFEGWEKALLNTLEVMEKTADSFEIFENSTYLLPK	
YDVPPDKTLEEYLRELAYKGLRQRIERGQAKDTKEYWERLEYELEVINKM	400
GFAGYFLIVQDFINWAKKNDIPVGPGRGSAGGSLVAYAIGITDVPDIKHG	
FLFERFLNPERVSMPIIDVDFCQDNREKVIEWVRNKYGHDNVAQIITYNV	500
MKAKQTLRDVARAMGLPYSTADKLAKLIPOGDVQGTWLSLEEMYKTPVEE	
LLQKYGEHRDIEDNVKKFRQICEESPEIKQLVETALKLEGLTRHTSLHA	600
AGVVIAPKPLSELVPLYDKEGEVATQYDMVQLEELGLLKMDFLGLKTLT	
ELKLMKELIKERHGVDINFLELPLDDPKVYKLLQEGKTTGVFQLESRGMK	700
ELLKKLKPDSDDDIVAVLALYRPGPLKSGLVDTYIKRKHGKEPVEYPFPE	
LEPVLKETYGIVYQEQVMKMSQILSGFTPGEADTLRKAIGKKKADLMAQ	800
MKDKFIQGAVERGYPEEKIRKLWEDIEKFASYSFNKSHSVAYGYISYWTA	
YVKAHYPAEFFAVKLTTEKNDNKFLNLIKDAKLFGEILPPDINKSDVGF	900
TIEGENRIRFGLARIKGVGEETAKIIVEARKKYKQFKGLADFINKTKNRK	
INKKVVEALVKAGAFDFTKKRKELLAKVANSEKALMATQNSLFGAPKEE	1000
VEELDPLKLEKEVLGFYISGHPLDNYEKLKKNRYTPIEDLEEDWKESEAV	
LTGVITELKVKKTKNGDYMVFNLVDKTGLIECVVFPGVYEEAKELIEED	1100
RVVVVKGFLDEDLETENVKFVVKEVFSPEEFKEMRNTLYIFLKREQALN	
GVAEKLKGIENNRTEDGYNLVLTVDLGDFVDLALPQDMKCLKADRKVVE	1161
EIEKLGVKVII	

FIG. 35

ATGAACTACGTTCCCTTCGCGAGAAAGTACAGACCGAAATTCTTCAGGGA	100
AGTAATAGGACAGGAAGCTCCCGTAAGGATACTCAAAAACGCTATAAAAA	
ACGACAGAGTGGCTCACGCCTACCTCTTTGCCGGACCGAGGGGGGTGGG	200
AAGACGACTATTGCAAGAATTCTCGCAAAAGCTTTGAACTGTAAAAATCC	
CTCCAAAGGTGAGCCCTGCGGTGAGTGCGAAAACTGCAGGGAGATAGACA	300
GGGGTGTGTTCCCTGACTTAATTGAAATGGATGCCGCCTCAAACAGGGGT	
ATAGACGACGTAAGGGCATTAAAAGAAGCGGTCAATTACAAACCTATAAA	400
AGGAAAGTACAAGGTTTACATAATAGACGAAGCTCACATGCTCACGAAAG	
AAGCTTTCAACGCTCTCTTAAAAACCCTCGAAGAGCCCCCTCCAGAACT	500
GTTTTCGTCCTTTGTACCACGGAGTACGACAAAATTCTTCCACGATACT	
CTCAAGGTGTCAGAGGATAATCTTCTCAAAGGTAAGAAAGGAAAAAGTAA	600
TAGAGTATCTAAAAAGATATGTGAAAAGGAAGGGATTGAGTGCGAAGAG	
GGAGCCCTTGAGGTTCTGGCTCATGCCTCTGAAGGGTGTCATGAGGGATGC	700
AGCCTCTCTCCTGGACCAGGCGAGCGTTTACGGGGAAGGCAGGGTAACAA	
AAGAAGTAGTGGAGAACTTCTCGGAATTCTCAGTCAGGAAAGCGTTAGG	800
AGTTTTCTGAAATTGCTTCTGAACTCAGAAGTGGACGAAGCTATAAAGTT	
CCTCAGAGAACTCTCAGAAAAGGGCTACAACCTGACCAAGTTTTGGGAGA	900
TGTTAGAAGAGGAAGTGAGAAACGCAATTTTAGTAAAGAGCCTGAAAAAT	
CCCGAAAGCGTGTTTCAAGAACTGGCAGGATTACGAAGACTTCAAAGACTA	1000
CCCTCTGGAAGCCCTCCTCTACGTTGAGAACCTGATAAACAGGGGGTAAAG	
TTGAAGCGAGAACGAGAGAACCTTAAGAGCCTTTGAACTCGCGGTAATA	1100
AAGAGCCTTATAGTCAAAGACATAATTCCCGTATCCAGCTCGGAAGTGT	
GGTAAAGGAAACCAAAAAGGAAGAAAAGAAAGTTGAAGTAAAAGAAGAGC	1200
CAAAAGTAAAAGAAGAAAAACCAAAGGAGCAGGAAGAGGACAGGTTCCAG	
AAAGTTTTAAACGCTGTGGACGGCAAAATCCTTAAAAGAATACTTGAAGG	1300
GGCAAAAAGGGAAGAAAGAGACGGAAAAATCGTCTTAAAGATAGAAGCCT	
CTTATCTGAGAACCATGAAAAAGGAATTTGACTCACTAAAGGAGACTTTT	1400
CCTTTTTTTAGAGTTTGAACCCGTGGAGGATAAAAAAAACCTCAGAAGTC	
CAGCGGGACGAGGCTGTTTTAAAGGTAAAGGAGCTCTTCAATGCAAAAAT	1500
ACTCAAAGTACGAAGTAAAAGCTAAGGTCATAAAGGTGAGAATGCCCGTG	
GAAGAGATAGGGCTGTTTAAACGCACTAATAGACGGCTTGCCAGGTACGC	1600
ACTCACGAGGACGAAGGAAAAGGGAAAGGGAGAAGTTTTCGTTTTAGCGA	
CTCCTTATAAAGTCAAGGAATTGATGGAAGCTATGGAGGGTATGAAAAAA	1700
CACATAAAGGATTTAGAAATCCTCGGAGAGACGGATGAGGATTTAACTTT	
TTAAAGTATGGGTGTATCTGAGCAAAGGTTTAAAGCTAAAAACAAACCTGA	1800
AACCCGCAGGGGACCAGCCGAAAGCCATAAAAAAACTCCTTGAAAACCTA	
AGGAAAGGCGTAAAAGAACAAACACTTCTCGGAGTCACGGGAAGCGGAAA	1900
GACTTTTACTCTAGCAAACGTAATAGCGAAGTACAACAAACCAACTCTTG	
TGGTAGTTCACAACAAAATTCTCGCGGCACAGCTATACAGGGAGTTTAAA	2000
GAAGTATTCCCTGAAAACGCTGTAGAGTACTTTGTCTTTACTACGACTA	
TTACCAACCTGAAGCCTACATTCCCGAAAAAGATTTATACATAGAAAAGG	2100
ACGCGAGTATAAACGAAAGCTGGAACGTTTCAGACACTCCGCCACGATAT	
CCGTTCTAGAAAGGAGGGACGTTATAGTAGTTGCTTCAGTTTCTTGCATA	2200
TACGGACTCGGGAAACCTGAGCACTACGAAAACCTGAGGATAAACTCCA	
AAGGGGAATAAGACTGAACTTGAGTAAGCTCCTGAGGAACTCGTTGAGC	2300
TAGGATATCAGAGAAATGACTTTGCCATAAAGAGGGCTACCTTCTCGGTT	
AGGGGAGACGTGGTTGAGATAGTCCCTTCTCACACGGAAGATTACCTCGT	2400
GAGGGTAGAGTTCTGGGACGACGAAGTTGAAAGAATAGTCTCATGGACG	
CTCTGAAC	

FIG. 36

MNYVPFARKYRPKFFREVIGQEAPVRILKNAIKNDRVAHAYLFAGPRGVG	
KTTIARILAKALNCKNPSKGPCGECENCREIDRGVFPDLIEMDAASNRG	100
IDDVRLALKEAVNYKPIKGKYKVYIIIDEAHMLTKEAFNALLKTLEPPPT	
VFVLCTTEYDKILPTILSRCQRIIFSQRKEKVIEYLLKKICEKEGIECEE	200
GALEVLAHASEGCMRDAASLLDQASVYGEGRVTKEVVENFLGILSQESVR	
SFLKLLLNSEVDEAIKFLRELSEKGYNLTKFWEMLEEEVRNAILVKSLKN	300
PESVVQNWDYEDFKDYPLEALLYVENLINRGKVEARTREPLRAFELAVI	
KSLIVKDIIPVSQLGSVVKETKKEEKKEVEVKEEPKVKEEKPKQEEDRFQ	400
KVLNAVDGKILKRILEGAKREERDGKIVLKIEASYLRTMKKEFDSLKETF	
PFLEFEPVEDKKKPQKSSGTRLF	473

**FIG. 37**

ATGCGCGTTAAGGTGGACAGGGAGGAGCTTGAAGAGGTTCTTAAAAAAGC	100
AAGAGAAAGCACGGAAAAAAGCCGCACTCCCGATACTCGCGAACTTCT	
TACTCTCCGCAAAAGAGGAAAACCTTAATCGTAAGGGCAACGGACTTGGA	200
AACTACCTTGTAGTCTCCGTAAAGGGGGAGGTTGAAGAGGAAGGAGAGGT	
TTGCGTCCACTCTCAAAAACCTCTACGATATAGTCAAGAACTTAAATTCCG	300
CTTACGTTTACCTTCATACGGAAGGTGAAAAACTCGTCATAACGGGAGGA	
AAGAGTACGTACAAACTTCCGACAGCTCCCGCGGAGGACTTTCCTCAATT	400
TCCAGAAATCGTAGAAGGAGGAGAAACACTTTCGGGAAACCTTCTCGTTA	
ACGGAATAGAAAAGGTAGAGTACGCCATAGCGAAGGAAGAAGCGAACATA	500
GCCCTTCAGGGAATGTATCTGAGAGGATACGAGGACAGAATTCACTTTGT	
GTTCCGGACGGTCACAGGCTTGCACTTTATGAACCTCTACGTAAACATTGA	600
AAAGAGTGAAGACGAGTCTTTTGCTTACTTCTCCACTCCCGAGTGGAAAC	
TCGCCGTTAGCTCCTGGAAGGAGAATTCCCGGACTACATGAGTGTCATCC	700
CTGAGGAGTTTTTCGGCGGAAGTCTTGTTTGAGACAGAGGAAGTCTTAAAG	
GTTTTAAAGAGGTTGAAGGCTTTAAGCGAAGGAAAAGTTTTTCCCGTGAA	800
GATTACCTTAAGCGAAAACCTTGCCATCTTTGAGTTCGCGGATCCGGAGT	
TCGGAGAAGCGAGAGAGGAAATTGAAGTGAGTACACGGGAGAGCCCTTT	900
GAGATAGGATTCAACGGAAATACCTTATGGAGGCGCTTGACGCCTACGAC	
AGCGAAAGAGTGTGGTTCAAGTTCACAACCCCCGACACGGCCACTTTATT	1000
GGAGGCTGAAGATTACGAAAAGGAACCTTACAAGTGCATAATAATGCCGA	
TGAGGGTGTAGCCATGAAAAAGCTTTAATCTTTTTATTGAGCTTGAGCC	1090
TTTTAATTCCTGCGTTTAGCGAAGCCAAACCCAAGTCTTC	

FIG. 38

MRVKVDREELEEVLKKARESTEKKAALPILANFLLSAKEENLIVRATDLE	100
NYLVVSVKGEVEEEGEVVCVHSQKLYDIVKNLNSAYVYLHTEGEKLKITGG	
KSTYKLPTAPAEDEFPEFPEIVEGGETLSGNLLVNGIEKVEYAIKEEANI	200
ALQMYLRGYEDRIHFVGS DGHRLALYEPLGEFSKELLI PRKSLKVLKKL	
ITGIEDVNIEKSEDES FAYFSTPEWKLA VRLLEGEFPDYMSVIPEEFSAE	300
VLFEETEEVLKVLKRLKALSEGKVFPVKITLSENLAIFEFADPEFGEAREE	
IEVEYTGEPFEIGFNGKYLMEALDAYDSERVWFKFTTPDTATLLEAEDYE	363
KEPYKCIIMPMRV	

FIG. 39



GTGGAAACCACAATATTCCAGTTCAGAAAACTTTTTTCACAAAACCTCC	
GAAGGAGAGGGTCTTCGTCTTTCATGGAGAAGAGCAGTATCTCATAAGAA	100
CCTTTTTGTCTAAGCTGAAGGAAAAGTACGGGGAGAATTACACGGTCTG	
TGGGGGGATGAGATAAGCGAGGAGGAATTCTACACTGCCCTTTCCGAGAC	200
CAGTATATTCCGGCGGTTCAAAGGAAAAAGCGGTGGTCATTTACAACCTTCG	
GGGATTTCTGAAGAAGCTCGGAAGGAAGAAAAAGGAAAAAGAAAGGCTT	300
ATAAAAGTCCTCAGAAACGTAAAGAGTAACTACGTATTTATAGTGTACGA	
TGCGAAACTCCAGAAACAGGAACTTTCTTCGGAACCTCTGAAATCCGTAG	400
CGTCTTTTCGGCGGTATAGTGGTAGCAAACAGGCTGAGCAAGGAGAGGATA	
AAACAGCTCGTCCTTAAGAAGTTCAAAGAAAAAGGGATAAACGTAGAAAA	500
CGATGCCCTTGAATACCTTCTCCAGCTCACGGGTTACAACCTTGATGGAGC	
TCAAACCTTGAGGTTGAAAAACTGATAGATTACGCAAGTGAAAAGAAAATT	600
TTAACTCTCGATGAGGTAAAGAGAGTAGCCTTCTCAGTCTCAGAAAACGT	
AAACGTATTTGAGTTCGTTGATTTACTCCTCTTAAAAGATTACGAAAAGG	700
CTCTTAAAGTTTTGGACTCCCTCATTTCTTCGGAATACACCCCTCCAG	
ATTATGAAAATCCTGTCCTCCTATGCTCTAAACTTTACACCTCAAGAG	800
GCTTGAAGAGAAGGGAGAGGACCTGAATAAGGCGATGGAAAGCGTGGGAA	
TAAAGAACAACCTTTCTCAAGATGAAGTTCAAATCTTACTTAAAGGCAAAC	900
TCTAAAGAGGACTTGAAGAACCTAATCCTCTCCCTCCAGAGGATAGACGC	
TTTTTCTAAACTTTACTTTTCAGGACACAGTGCAGTTGCTGGGGATTTCTT	1000
GACCTCAAGACTGGAGAGGGAAGTTGTGAAAAATACTTCTCATGGTGGAT	
AATCTTTTTTATGAAGTTTGCGGTTTGCGTTTTTCCCGGTTCT	1093

FIG. 40

VETTIFQFQKTFFTKPPKERVFLHGEEQYLIRTFLSKLKEKYGENYTVL	
WGDEISEEEFYTALSETSI FGGSKEKAVVIYNFGDFLKKLGRKKKEKERL	100
IKVLRNVKSNYVFIVYDAKLQKQELSSPELKSVA SFGGIVVANRLSKERI	
KQLVLKKFKEKGINVENDALEYLLQLTGYNLMELKLEVEKLIDYASEKKI	200
LTLDEVKRVAFSVSENVNVFEFVDLLLLLDYKALKVLDLSISFGIHPLQ	
IMKILSSYALKLYTLKRLEEKGEDLNKAMESVG IKNFLKMKFKSYLKAN	300
SKEDLKNLILSLQRIDAFSKLYFQDTVQLLRDFLT SRLEREVVKN TSHGG	

FIG. 41

ATGGAAAAAGTTTTTTTGGAAAACTCCAGAAACCTTGCACATACCCGG	
AGGACTCCTTTTTTACGGCAAAGAAGGAAGCGGAAAGACGAAAAACAGCTT	100
TTGAATTTGCAAAAGGTATTTTATGTAAGGAAAACGTACCTGGGGATGCG	
GAAGTTGTCCCTCCTGCAAACACGTAAACGAGCTGGAGGAAGCCTTCTTT	200
AAAGGAGAAATAGAAGACTTTTAAAGTTTATAAGACAAGGACGGTAAAAAG	
CACTTCGTTTACCTTATGGGCGAACATCCCGACTTTGTGGTAATAATCCC	300
GAGCGGACATTACATAAAGATAGAACAGATAAGGGAAGTTAAGAACTTTG	
CCTATGTGAAGCCCGCACTAAGCAGGAGAAAAGTAATTATAATAGACGAC	400
GCCACGCGATGACCTCTCAGGCGGCAAACGCTCTTTTAAAGGTATTGGA	
AGAGCCACCTGCGGACACCACCTTTATCTTGACCACGAACAGGCGTTCTG	500
CAATCCTGCCGACTATCCTCTCCAGAACTTTTCAAGTGGAGTTCAAGGGC	
TTTTCAGTAAAAGAGGTTATGGAAATAGCGAAAGTAGACGAGGAAATAGC	600
GAAACTCTCTGGAGGCAGTCTAAAAGGGCTATCTTACTAAAGGAAAACA	
AAGATATCCTAAACAAAGTAAAGGAATTCTTGGAAAACGAGCCGTTAAAA	700
GTTTACAAGCTTGCAAGTGAATTCGAAAAGTGGGAACCTGAAAAGCAAAA	
ACTCTTCCTTGAAATTATGGGAAGAATTGGTATCTCAAAAATTGACCGAAG	800
AGAAAAAAGACAATTACACCTACCTTCTTGATACGATCAGACTCTTTAAA	
GACGGACTCGCAAGGGGTGTAAACGAACCTCTGTGGCTGTTTACGTTAGC	900
CGTTCAGGCGGATTAATAAACCGTTATTGATTCCGTAACATTTAAACCTT	
AATCTAAATTATGAGAGCCTTTGAAGGAGGTCTGGTATGGAAAATTTGAA	1000
GATTAGATATATAGATACGAGGAAGATAGGAACCGTGAGCGGTGTAAAAG	
T	1051

FIG. 42

MEKVFLEKLQKTLHIPGGLLFYKGESGKTKTAFEFAKGILCKENVPWGC	
GSCPSCKHVNELEEAFFKGEIEDFKVYKDKDGKKHVFVYLMGEHPDFVVI	100
PSGHYIKIEQIREVKNFAYVKPALSRRKVI IIDDAHAMTSQAANALLKVL	
EEPPADTTFILTTNRRSAILPTILSRTFQVEFKGFSVKEVMEIAKVDEEI	200
AKLSGGSCLKRAILLKENKDILNKVKEFLENEPLKVYKLASEFEKWEPEKQ	
KLFLEIMEELVSQKLTEEKKDNYTYLLDTIRLFKDGLARGVNEPLWLFTL	300
AVQAD	

FIG. 43

ATGAACTTCCTGAAAAAGTTCCTTTTACTGAGAAAAGCTCAAAGTCTCC  
 TTA CTTCGAAGAGTTCTACGAAGAAATCGATTTGAACCAGAAGGTGAAAG 100  
 ATGCAAGGTTTGTAGTTTTTGA CTGCGAAGCCACAGA ACTCGACGTAAAG  
 AAGGCAAACTCCTTTCAATAGGTGCGGTTGAGGTAAAAACCTGGAAAT 200  
 AGACCTCTCTAAATCTTTTTACGAGATACTCAAAGTGACGAGATAAAGG  
 CGGCGGAGATACATGGAATAACCAGGGAAGACGTTGAAAAGTACGGAAAG 300  
 GAACCAAAGGAAGTAATATACGACTTTCTGAAGTACATAAAGGGAAGCGT  
 TCTCGTTGGCTACTACGTGAAGTTTGACGTCTCACTCGTTGAGAAGTACT 400  
 CCATAAAGTACTTCCAGTATCCAATCATCAACTACAAGTTAGACCTGTTT  
 AGTTTCGTGAAGAGAGAGTACCAGAGTGGCAGGAGTCTTGACGACCTTAT 500  
 GAAGGAACTCGGTGTAGAAATAAGGGCAAGGCACAACGCCCTTGAAGATG  
 CCTACATAACCGCTCTTCTTTTCCTAAAGTACGTTTACCCGAACAGGGAG 600  
 TACAGACTAAAGGATCTCCCGATTTTCCTT

FIG. 44

MNFLKKFLLLRKAQKSPYFEEFYEEIDLNQKVKDARFVVFDCEATELDVK  
 KAKLLSIGAVEVKNLEIDLSKSFYEILKSDEIKAAEIHGITREDVEKYGK 100  
 EPKEVIYDFLKYIKGSVLVGYYVKFDVSLVEKYSIKYFQYPIINYKLDLF  
 SFVKREYQSGRSLDDL MKELGVEIRARHNALEDAYITALLFLKYVYPNRE 200  
 YRLKDLPIFL

FIG. 45

ATGCTCAATAAGGTTTTTATAATAGGAAGACTTACGGGTGACCCCGTTAT	
AACTTATCTACCGAGCGGAACGCCCCTAGTAGAGTTTACTCTGGCTTACA	100
ACAGAAGGTATAAAAACCAGAACGGTGAATTTTCAGGAGGAAAGTCACTTC	
TTTGACGTAAAGGCGTACGGAAAAATGGCTGAAGACTGGGCTACACGCTT	200
CTCGAAAGGATACCTCGTACTCGTAGAGGGAAGACTCTCCCAGGAAAAGT	
GGGAGAAAGAAGGAAAGAAGTTCTCAAAGGTCAGGATAATAGCGGAAAC	300
GTAAGATTAATAAACAGGCCGAAAGGTGCTGAACTTCAAGCAGAAGAAGA	
GGAGGAAGTTCCTCCCATTTGAGGAGGAAATTGAAAACTCGGTAAAGAGG	400
AAGAGAAGCCTTTTACCGATGAAGAGGACGAAATACCTTTTTTAATTTTGA	
GGAGGTTAAAGTATGGTAGTGAGAGCTCCTAAGAAGAAAGTTTGTATGTA	500
CTGTGAACAAAAGAGAGAGCCAGATT	

**FIG. 46**

MLNKVFIIGRLTGDPVITYLPSGTPVVEFTLAYNRRYKNQNGEFQEEESHF	
FDVKAYGKMAEDWATRFSGYLVLEGRLSQEKWEKEGKKFSKVRIIAEN	100
VRLINRPKGAEELQAEIEEEVPPIEEEIEKLGKEEEKPFTDEEDEIIPF	

**FIG. 47**

ATGCAATTTGTGGATAAACTTCCCTGTGACGAATCCGCCGAGAGGGCGGT	
TCTTGGCAGTATGCTTGAAGACCCCGAAAACATACCTCTGGTACTTGAAT	100
ACCTTAAAGAAGAAGACTTCTGCATAGACGAGCACAAAGCTACTTTTCAGG	
GTTCTTACAAACCTCTGGTCCGAGTACGGCAATAAGCTCGATTTTCGTATT	200
AATAAAGGATCACCTTGAAAAGAAAACTTACTCCAGAAAATACCTATAG	
ACTGGCTCGAAGAACTCTACGAGGAGGCGGTATCCCCTGACACGCTTGAG	300
GAAGTCTGCAAAATAGTAAAACAACGTTCCGCACAGAGGGCGATAATTCA	
ACTCGGTATAGAACTCATTACAAAAGGAAAGGAAAAACAAAGACTTTTACA	400
CATTAATCGAGGAAGCCCAGAGCAGGATATTTTCCATAGCGGAAAGTGCT	
ACATCTACGCAGTTTACCATGTGAAAGACGTTGCGGAAGAAGTTATAGA	500
ACTCATTTATAAATTCAAAGCTCTGACAGGCTAGTCACGGGACTCCCAA	
GCGGTTTCACGGAACCTCGATCTAAAGACGACGGGATTCCACCCTGGAGAC	600
TTAATAATACTCGCCGCAAGACCCGGTATGGGGAAAACCGCCTTTATGCT	
CTCCATAATCTACAATCTCGCAAAAGACGAGGGAAAACCTCAGCTGTAT	700
TTTCCTTGGAATGAGCAAGGAACAGCTCGTTATGAGACTCCTCTCTATG	
ATGTCGGAGGTCCCACTTTTCAAGATAAGGTCTGGAAGTATATCGAATGA	800
AGATTTAAAGAAGCTTGAAGCAAGCGCAATAGAACTCGCAAAGTACGACA	
TATACCTCGACGACACACCCGCTCTCACTACAACGGATTTAAGGATAAGG	900
GCAAGAAAGCTCAGAAAGGAAAAGGAAGTTGAGTTCGTGGCGGTGGACTA	
CTTGCAACTTCTGAGACCGCCAGTCCGAAAGAGTTCAAGACAGGAGGAAG	1000
TGGCAGAGGTTTCAAGAACTTAAAAGCCCTTGCAAAGGAACTTCACATT	
CCCGTTATGGCACTTGCGCAGCTCTCCCGTGAGGTGGAAAAGAGGAGTGA	1100
TAAAAGACCCCAGCTTGCGGACCTCAGAGAATCCGGACAGATAGAACAGG	
ACGCAGACCTAATCCTTTTCTCCACAGACCCGAGTACTACAAGAAAAAG	1200
CCAAATCCCGAAGAGCAGGGTATAGCGGAAGTGATAATAGCCAAGCAAAG	
GCAAGGACCCACGGACATTGTGAAGCTCGCATTTATTAAGGAGTACACTA	1300
AGTTTGCAAACCTAGAAGCCCTTCTGAACAACCTCCTGAAGAAGAGGAA	
CTTTCGGAATTATTGAAACACAGGAGGATGAAGGATTGAAGATATTGA	1400
CTTCTGAAAATTAAGGTTTTATAATTTTATCTTGGCTATCCGGGGTAGCT	
CAATCGGCAGAGCGGGTGGCTG	1472

FIG. 48

MQFVDKLPCEDESAERAVLGSMLEDPENIPLVLEYLKEEDFCIDEHKLLFR	
VLTNLWSEYGNKLDVFLIKDHLEKKNLLQKIPIDWLEELYEEAVSPDTLE	100
EVCKIVKQRSAQRAIIQLGITSTQFYHVKDVAEEVIELIYKFKSSDRLVT	
GLPSGFTELDLKTTFHFGDLIIAARPGMGKTAFMLSIIYNLAKDEGKP	200
SAVFSLEMSKEQLVMRLLSMMSEVPLFKIRSGSISNEDLKKLEASAIELA	
KYDIYLLDDTPALTTDLRIRARKLRKEKEVEFVAVDYLQLLRPPVRKSSR	300
QEEVAEVSRLKALAKELHIPVMALAQLSREVEKRSDKRPQLADLRESGQ	
IEQDADLILFLHRPEYYKKPNPEEQGIAEVI IAKQRQGPTDIVKLAFIK	400
EYTKFANLEALPEQPPEEEELSEIIETQEDEGFEDIDF	

FIG. 49

ATGTCCTCGGACATAGACGAACTTAGACGGGAAATAGATATAGTAGACGT	
CATTTCCGAATACTTAACTTAGAGAAGGTAGGTTCCAATTACAGAACGA	100
ACTGTCCCTTTTACCCTGACGATACACCCTCCTTTTACGTGTCTCCAAGT	
AAACAAATATTCAAGTGTTTCGGTTGCGGGTAGGGGGAGACGCGATAAA	200
GTTTCGTTTCCCTTTTACGAGGACATCTCCTATTTTGAAGCCGCCCTTGAAC	
TCGCAAAACGCTACGGAAGAAATTAGACCTTGAAAAGATATCAAAAGAC	300
GAAAAGGTATACGTGGCTCTTGACAGGGTTTGTGATTTCTACAGGGAAAG	
CCTTCTCAAAAACAGAGAGGCAAGTGAGTACGTAAAGAGTAGGGGAATAG	400
ACCCTAAAGTAGCGAGGAAGTTTGATCTTGGGTACGCACCTTCCAGTGAA	
GCACTCGTAAAAGTCTTAAAAGAGAACGATCTTTTAGAGGCTTACCTTGA	500
AACTAAAACCTCCTTTCTCCTACGAAGGGTGTTTACAGGGATCTCTTTC	
TTTCGGCGTGTCGTGATCCCGATAAAGGATCCGAGGGGAAGAGTTATAGGT	600
TTTCGGTGGAAGGAGGATAGTAGAGGACAAATCTCCAAGTACATAAACTC	
TCCAGACAGCAGGGTATTTAAAAGGGGGAGAACTTATTCGGTCTTTACG	700
AGGCAAAGGAGTATATAAAGGAAGAAGGATTTGCGATACTTGTGGAAGGG	
TACTTTGACCTTTTGTGACTTTTTTCCGAGGGAATAAGGAACGTTGTTGC	800
ACCCCTCGGTACAGCCCTGACCCAAAATCAGGCAAACCTCCTTTCCAAGT	
TCACAAAAAAGGTCTACATCCTTTACGACGGAGATGATGCGGGAAGAAAG	900
GCTATGAAAAGTGCCATTCCCCTACTCCTCAGTGCAGGAGTGGAAGTTTA	
TCCCGTTTACCTCCCCGAAGGATACGATCCCGACGAGTTTATAAAGGAAT	1000
TCGGGAAAGAGGAATTAAGAAGACTGATAAACAGCTCAGGGGAGCTCTTT	
GAAACGCTCATAAAAACCGCAAGGGAAAACCTTAGAGGAGAAAACGCGTGA	1100
GTTTCAGGTATTATCTGGGCTTTATTTCCGATGGAGTAAGGCGCTTTGCTC	
TGGCTTCGGAGTTTACACCAAGTACAAAGTTCCTATGGAAATTTTATTA	1200
ATGAAAATTGAAAAAATTCTCAAGAAAAAGAAATTAACTCTCCTTTAA	
GGAAAAAATCTTCCTGAAAGGACTGATAGAATTAAAACCAAAAATAGACC	1300
TTGAAGTCCTGAACTTAAGTCCTGAGTTAAAGGAACTCGCAGTTAACGCC	
TTAAACGGAGAGGAGCATTACTTCCAAAAGAAGTTCTCGAGTACCAGGT	1400
GGATAACTTGGAGAACTTTTAAACAACATCCTTAGGGATTTACAAAAT	
CTGGGAAAAAGAGGAAGAAAAGAGGGTTGAAAAATGTAAATACTTAATTA	1500
ACTTTAATAAATTTTATAGAGTTAGGA	

FIG. 50

MSSDIDELRREIDIVDVISEYLNLEKVGSNYRTNCPFHPDDTPSFYVSPS	
KQIFKCFGCGVGDAIKFVSLYEDISYFEAALELAKRYGKKLDLEKISKD	100
EKVYVALDRVCDFYRESLLKNREASEYVKSRGIDPKVARKFDLGYAPSSE	
ALVKVLKENDLLEAYLETKNLLSPTKGVYRDLFLRRVVIPIKDPRGRVIG	200
FGRRIVEDKSPKYINSPDSRVFKKGENLFGLYEAKYIKEEGFAILVEG	
YFDLLRLFSEGIRNVVAPLGTALTQNQANLLSKFTKKVYILYDGDDAGRK	300
AMKSAIPLLLSAGVEVYPVYLPEGYDPDEFIKEFGKEELRRLINSSGELF	
ETLIKTARENLEEKTRFRYYLGFISDGVRRFALASEFHTKYKVPMEILL	400
MKIEKNSQEKEIKLSFKEKIFLKGLIELKPKIDLEVLNLSPELKELAVNA	
LNGEEHLLPKEVLEYQVDNLEKLFNNILRDLQSGKKRKKRGLKNVNT	498

FIG. 51

ATGCAAGATACCGCTACCTGCAGTATTTGTCAGGGGACGGGATTTCGTAAA	
GACCGAAGACAACAAGGTAAGGCTCTGCGAATGCAGGTTCAAGAAAAGGG	100
ATGTAAACAGGGAACTAAACATCCCAAAGAGGTACTGGAACGCCAACTTA	
GACACTTACCACCCCAAGAACGTATCCCAGAACAGGGCACTTTTGACGAT	200
AAGGGTCTTCGTCCACAACCTTCAATCCCGAGGAAGGGAAAGGGCTTACCT	
TTGTAGGATCTCCTGGAGTCGGCAAACTCACCTTGCGGTTGCAACATTA	300
AAAGCGATTTATGAGAAGAAGGGAATCAGAGGATACTTCTTCGATACGAA	
GGATCTAATATTCAGGTTAAAACACTTAATGGACGAGGGAAAGGATACAA	400
AGTTTTTAAAAACTGTCTTAAACTCACCGGTTTTGGTTCTCGACGACCTC	
GGTTCTGAGAGGCTCAGTGACTGGCAGAGGGAATCATCTCTTACATAAT	500
CACTTACAGGTATAACAACCTTAAGAGCACGATAATAACCACGAATTACT	
CACTCCAGAGGGAAGAAGAGAGTAGCGTGAGGATAAGTGCGGATCTTGCA	600
AGCAGACTCGGAGAAAACGTAGTTTCAAAAATTTACGAGATGAACGAGTT	
GCTCGTTATAAAGGGTCCGACCTCAGGAAGTCTAAAAAGCTATCAACCC	700
CATCT	

FIG. 52

MQDTATCSICQGTGFVKTEDNKNVRLCECRFKKRDVNRELNIPKRYWNANL	
DTYHPKNVSQNRALLTIRVFNHFNPEEGKGLTFVGSPGVGKTHLAVATL	100
KAIYEKKGIRGYFFDTKDILFRLKHLMDGKDTKFLKTVLNSPVLVLDL	
GSERLSDWQRELISYIITYRYNNLKSTIITNYSLOREEESSVRISADLA	200
SRLGENVVSKIYEMNELLVIKGSDLRKS KKLSTPS	

FIG. 53

ATGAAAAAGATTGAAAATTTGAAGTGGAAAAATGTCTCGTTTAAAAGCCT	
GGAAATAGATCCCGATGCAGGTGTGGTTCTCGTTTCCGTGGAAAAATTTCT	100
CCGAAGAGATAGAAGACCTTGTGCGTTTACTGGAGAAGAAGACGCGGTTT	
CGAGTCATCGTGAACGGTGTTCAAAAAAGTAACGGGGATCTAAGGGGAAA	200
GATACTTTCCCTTCTCAACGGTAATGTGCCTTACATAAAAGATGTTGTTT	
TCGAAGGAAACAGGCTGATTCTGAAAGTGCTTGGAGATTTTCGCGCGGGAC	300
AGGATCGCCTCCAAACTCAGAAGCACGAAAAACAGCTCGATGAACTGCT	
GCCTCCCGGAACAGAGATCATGCTGGAGGTTGTGGAGCCTCCGGAAGATC	400
TTTTGAAAAAGGAAGTACCACAACCAGAAAAGAGAGAAGAACCAAAGGGT	
GAAGAATTGAAGATCGAGGATGAAAACCATCTTTGGACAGAAACCCAG	500
AAAGATCGTCTTCACCCCCTCAAAAATCTTTGAGTACAACAAAAGACAT	
CGGTGAAGGGCAAGATCTTCAAAATAGAGAAGATCGAGGGGAAAAGAACG	600
GTCTTCTGATTTACCTGACAGACGGAGAAGATTCTCTGATCTGCAAAGT	
CTTCAACGACGTTGAAAAGGTGGAAGGGAAAGTATCGGTGGGAGACGTGA	700
TCGTTGCCACAGGAGACCTCCTTCTCGAAAACGGGGAGCCACCTTTAC	
GTGAAGGGAATCACAAAACCTTCCCGAAGCGAAAAGGATGGACAAATCTCC	800
GGTTAAGAGGGTGGAGCTCCACGCCCATACCAAGTTCAGCGATCAGGACG	
CAATAACAGATGTGAACGAATATGTGAAACGAGCCAAGGAATGGGGCTTT	900
CCCGCGATAGCCCTCACGGATCATGGGAACGTTTCAGGCCATACCTTACTT	
CTACGACGCGGCGAAAGAAGCTGGAATAAAGCCCATTTTTCGGTATCGAAG	1000
CGTATCTGGTGAGTGACGTGGAGCCCGTCATAAGGAATCTCTCCGACGAT	
TCGACGTTTGGAGATGCCACGTTTCGTCTCCTCGACTTCGAGACGACGGG	1100
TCTCGACCCGCAGGTGGATGAGATCATCGAGATAGGAGCGGTGAAGATAC	
AGGGTGGCCAGATAGTGGACGAGTACCACACTCTCATAAAGCCTTCCAGG	1200
GAGATCTCAAGAAAAAGTTTCGGAGATCACCGGAATCACTCAAGAGATGCT	
GGAAAACAAGAGAAGCATCGAGGAAGTTCTGCCGGAGTTCTTCGGTTTTTC	1300
TGGAAGATTCCATCATCGTAGCACACAACGCCAACTTCGACTACAGATTT	
CTGAGGCTGTGGATCAAAAAAGTGATGGGATTGGACTGGGAAAGACCCTA	1400
CATAGATACGCTCGCCCTCGCAAAGTCCCTTCTCAAACCTGAGAAGCTACT	
CTCTGGATTCGTTGTGGAAAAGCTCGGATTGGGTCCCTTCCGGCACCAC	1500
AGGGCCCTGGATGACGCGAGGGTCACCGCTCAGGTTTTCTCAGGTTTCGT	
TGAGATGATGAAGAAGATCGGTATCACGAAGCTTTCAGAAATGGAGAAGT	1600
TGAAGGATACGATAGACTACACCGCGTTGAAACCCTTCCACTGCACGATC	
CTCGTTTCAAGACAAAAGGGATTGAAAAACCTATACAACTGGTTTTCTGA	1700
TTCTATATAAAGTACTTCTACGGTGTTCCGAGGATCCTCAAAGTGAGC	
TCATCGAGAACAGAGAAGGACTGCTCGTGGGTAGCGCGTGTATCTCCGGT	1800
GAGCTCGGACGTGCCGCCCTCGAAGGAGCGAGTGATTGAGAACTCGAAGA	
GATCGCGAAGTTCTACGACTACATAGAAGTCATGCCGCTCGACGTTATAG	1900
CCGAAGATGAAGAAGACCTAGACAGAGAAAGACTGAAAGAAGTGTAACGA	
AAACTCTACAGAATAGCGAAAAAATTGAACAAGTTCGTCTCATGACCGG	2000
TGATGTTTCAATTCCTCGATCCCGAAGATGCCAGGGGCAGAGCTGCACTTC	
TGGCACCTCAGGGAAACAGAACTTCGAGAATCAGCCCGCACTCTACCTC	2100
AGAACGACCGAAGAAATGCTCGAGAAGGCGATAGAGATATTCGAAGATGA	
AGAGATCGCGAGGGAAGTCGTGATAGAGAATCCCAACAGAATAGCCGATA	2200
TGATCGAGGAAGTGCAGCCGCTCGAGAAAAAATTCACCCGCCGATCATA	
GAGAACGCCGATGAAATAGTGAGAAACCTCACCATGAAGCGGGCGTACGA	2300
GATCTACGGTGATCCGCTTCCCGAAATCGTCCAGAAGCGTGTGGAAAAGG	

FIG. 54A



AACTGAACGCCATCATAAATCATGGATACGCCGTTCTCTATCTCATCGCT 2400  
 CAGGAGCTCGTTTACAGAAATCTATGAGCGATGGTTACGTGGTTGGATCCAG  
 AGGATCCGTCGGGTCTTCACTCGTGGCCAATCTCCTCGGAATAACAGAGG 2500  
 TGAATCCCCTACCACCACATTACAGGTGTCCAGAGTGCAAATACTTTGAA  
 GTTGTCTGAAGACGACAGATACGGAGCGGGTTACGACCTTCCCAACAAGAA 2600  
 CTGTCCAAGATGTGGGGCTCCTCTCAGAAAAGACGGCCACGGCATAACCGT  
 TTGAAACGTTTATGGGGTTCGAGGGTGACAAGGTCCCCGACATAGATCTC 2700  
 AACTTCTCAGGAGAGTATCAGGAACGTGCTCATCGTTTTGTGGAAGAACT  
 CTTTCGGTAAAGACCACGTCTATAGGGCGGGAACCATAAACACCATCGCGG 2800  
 AAAGAAGTGCGGTGGGTACGTGAGAAGCTACGAAGAGAAAACCGGAAAG  
 AAGCTCAGAAAGGCGGAAATGGAAAGACTCGTTTTCCATGATCACGGGAGT 2900  
 GAAGAGAACGACGGGTACGACCCAGGGGGGCTCATGATCATAACGAAAG  
 ACAAGAAGTCTACGATTTCACTCCCATAACAGTATCCAGCCAACGATAGA 3000  
 AACGCAGGTGTGTTTACCACGCACTTCGCATACGAGACGATCCATGATGA  
 CCTGGTGAAGATAGATGCGCTCGGCCACGATGATCCCCTTTTATCAAGA 3100  
 TGCTCAAGGACCTCACCGGAATCGATCCCATGACGATTCCTATGGATGAC  
 CCCGATACGCTCGCCATATTAGTTCTGTGAAGCCTCTTGGTGTGGATCC 3200  
 CGTTGAGCTGGAAAGCGATGTGGGAACGTACGGAATTCCGGAGTTTCGGAA  
 CCGAGTTTGTGAGGGGAATGCTCGTTGAAACGAGACCAAAGAGTTTCGCC 3300  
 GAGCTTGTGAGAATCTCAGGACTGTACACGGTACGGACGTCTGGTTGAA  
 CAACGCACGTGATTGGATAAACCTCGGCTACGCCAAGCTCTCCGAGGTTA 3400  
 TCTCGTGTAGGGACGACATCATGAACTTCTCATAACAAAGGAATGGAA  
 CCGTCACTTGCCCTTCAAGATCATGGAAAACGTACGGAAGGGAAAGGGTAT 3500  
 CACAGAAGAGATGGAGAGCGAGATGAGAAGGCTGAAGGTTCCAGAATGGT  
 TCATCGAATCCTGTAAAAGGATCAAATATCTCTTCCCGAAAGCTCACGCT 3600  
 GTGGCTTACGTGAGTATGGCCTTACAGAATTGCTTACTTCAAGGTTCACTA  
 TCCTCTTACGTTTACGCGGCGTACTTCACGATAAAAGGTGATCAGTTTCG 3700  
 ATCCGGTTCTCGTACTCAGGGGAAAAGAGCCATAAAGAGGCGCTTGAGA  
 GAACTCAAAGCGATGCCTGCCAAAGACGCCCAGAAGAAAACGAAGTGAG 3800  
 TGTTCTGGAGGTTGCCCTGGAAATGATACTGAGAGGTTTTTCTTCTTAC  
 CGCCCGACATCTTCAAATCCGACGCGAAGAAATTTCTGATAGAAGGAAAC 3900  
 TCGCTGAGAATTCCGTTCAACAACTTCCAGGACTGGGTGACAGCGTTGC  
 CGAGTCGATAATCAGAGCCAGGGAAGAAAAGCCGTTCACTTCGGTGGAAAG 4000  
 ATCTCATGAAGAGGACCAAGGTCAACAAAAATCACATAGAGCTGATGAAA  
 AGCCTGGGTGTTCTCGGGGACCTTCCAGAGACGGAACAGTTTACGCTTTT 4100  
 C

FIG. 54B

MKKIENLKWKNVSFKSLEIDPDAGVVLVSVEKFSEEIEDLVRLLLEKKTRF	100
RVIVNGVQKSNGDLRGKILSLLNGNVPIKDVVFEGNRLILKVLGDFARD	
RIASKLRSTKKQLDELLPPGTEIMLEVVEPPEDLLKKEVPQPEKREEPKG	200
EELKIEDENHIFGQKPRKIVFTPSKIFEYNKKTsvkgkIFKIEKIEGKRT	
VLLIYLTGEDSLICKVFNDVEKVEGKVSVDVIVATGDLLLENGEPTLY	300
VKGITKLPEAKRMDKSPVKRVELHAHTKFSDDQDAITDVNEYVKRAKEWGF	
PAIALTDHGNVQAIPYFYDAAKEAGIKPIFGIEAYLVSDVEPVIRNLSDD	400
STFGDATFVVLDFETTGLDPQVDEIIIEIGAVKIQGGQIVDEYHTLIKPSR	
EISRSSEITGITQEMLENKRSIEEVLPEFLGFLEDSEIIVAHNANFDYRF	500
LRLWIKKVMGLDWERPYIDTLALAKSLLKLRSYSLDSVVEKLGLGPFRRH	
RALDDARVTAQVFLRFVEMMKKIGITKLSEMEKLKDTIDYTALKPFHCTI	600
LVQNKKGLKNLYKLVSdSYIKYFYGVPRILKSELiENREGLLVGSACISG	
ELGRAALEGASDSELEEIAKFYDYIEVMPLDVIAEDEEDLDRERLKEVYR	700
KLYRIAKKLNFVVMTGdVHFLDPEDARGRAALLAPQGNRNfENQPALYL	
RTTEEMLEKAIEIFEDEEIAREVVIEPNRIADMIEEVQPLEKKLHPPII	800
ENADEIVRNLTMKRAYEIIYGDPLPEIVQKRVEKELNAIINHGYAVLYLIA	
QELVQKMSDGYVVGSRGsvGSSLVANLLGITEVNPLPPHYRCPECKYFE	900
VVEDDRYGAGYDLPNKNCPRCGAPLRKDGHGIPFETFMGFEGDKVPDIDL	
NFSGEYQERAHRFVEELFGKDHVYRAGTINTIAERSAVGYVRSYEEKTGK	1000
KLRKAEMERLVSMITGVKRTTGQHPGGLMII PKDKEVYDFTPIQYPANDR	
NAGVFTTHFAYETIHDDLVKIDALGHDDPTFIKMLKDLTGIDPMTIPMDD	1100
PDTLAIFFSSVKPLGVDPVELESDVGTYGIPEFGTEFVRGMLVETRPKSFA	
ELVRISGLSHGTDVWLNNARDWINLGyakLSEVISCRDDIMNFLIHKGME	1200
PSLAFKIMENVRKGKGITEEMESEMRLKVPÉWFIESCKRIKYLFPKAHA	
VAYVSMAFRIAYFKVHYPLQFYAAyFTIKGDQFDpVLVLRGKEAIKRRLR	1300
ELKAMPAKDAQKNEVSVLEVALEMILRGFSFLPPDIFKSDAKKFLIEGN	
SLRIPFNKLPGLGDSVAESIIRAREEKpFTSVEDLMKRTKVnKNHIELMK	1367
SLGVLGDLPETEQFTLF	

FIG. 55

GTGCTCGCCATGATATGGAACGACACCGTTTTTTGCGTCGTCAGACACAGA	100
AACCACGGGAACCGATCCCTTTGCCGGAGACCGGATAGTTGAAATAGCCG	
CTGTTCTGTCTTCAAGGGGAAGATCTACAGAAACAAAGCGTTTCACTCT	
CTCGTGAATCCCAGAATAAGAATCCCTGCGCTGATTCAGAAAGTTCACGG	200
TATCAGCAACATGGACATCGTGGAAGCGCCAGACATGGACACAGTTTACG	
ATCTTTTCAGGGATTACGTGAAGGGAACGGTGCTCGTGTTTCACAACGCC	300
AACTTCGACCTCACTTTTCTGGATATGATGGCAAAGGAAACGGGAAACTT	
TCCAATAACGAATCCCTACATCGACACACTCGATCTTTCAGAAGAGATCT	400
TTGGAAGGCCTCATTCTCTCAAATGGCTCTCCGAAAGACTTGGAATAAAA	
ACCACGATACGGCACCGTGCTCTTCCAGATGCCCTGGTGACCGCAAGAGT	500
TTTTGTGAAGCTTGTTGAATTTCTTGGTGAAAACAGGGTCAACGAATTCA	
TACGTGGAAAACGGGGG	567

**FIG. 56**

MLAMIWNDTVFCVVDTETTGTDPFAGDRIVEIAAVPVFKGKIYRNKAFHS	
LVNPRIRIPALIQKVHGISNMDIVEAPDMDTVYDLFRDYVKGTVLVFNHNA	100
NFDLTFLDMMAKETGNFPITNPYIDTLDLSEEIFGRPHSLKWLSERLGIK	
TTIRHRALPDALVTARVFVKLVEFLGENRVNEFIRGKRG	189

**FIG. 57**

GTGGAAGTTCTTTACAGGAAGTACAGGCCAAAGACTTTTTCTGAGGTTGT	
CAATCAGGATCATGTGAAGAAGGCAATAATCGGTGCTATTCAGAAGAACA	100
GCGTGGCCACGGATACATATTCGCCGGTCCGAGGGGAACGGGGAAGACT	
ACTCTTGCCAGAATTCTCGAAAATCCCTGAACTGTGAGAACAGAAAGGG	200
AGTTGAACCCTGCAATTCCTGCAGAGCCTGCAGAGAGATAGACGAGGGAA	
CCTTCATGGACGTGATAGAGCTCGACGCGGCCTCCAACAGAGGAATAGAC	300
GAGATCAGAAGAATCAGAGACGCCGTTGGATACAGGCCGATGGAAGGTAA	
ATACAAAGTCTACATAATAGACGAAGTTCACATGCTCACGAAAGAAGCCT	400
TCAACGCGCTCCTCAAAACACTCGAAGAACCTCCTCCACGTCGTGTTC	
GTGCTGGCAACGACAAACCTTGAGAAGGTTCTCCACGATTATCTCGAG	500
ATGTCAGGTTTTCGAGTTCAGAAACATTCGACGAGCTCATCGAAAAGA	
GGCTCCAGGAAGTTGCGGAGGCTGAAGGAATAGAGATAGACAGGGAAGCT	600
CTGAGCTTCATCGCAAAAAGAGCCTCTGGAGGCTTGAGAGACGCGCTCAC	
CATGCTCGAGCAGGTGTGGAAGTTCGGAAGGAAAGATAGATCTCGAGA	700
CGGTACACAGGGCGCTCGGGTTGATACCGATACAGGTTGTTTCGCGATTAC	
GTGAACGCTATCTTTTCTGGTGATGTGAAAAGGGTCTTCACCGTTCTCGA	800
CGACGTCTATTACAGCGGGAAGGACTACGAGGTGCTCATTAGGAAGCAG	
TCGAGGATCTGGTCGAAGACCTGGAAAGGGAGAGAGGGGTTTACCAGGTT	900
TCAGCGAACGATATAGTTCAGGTTTCGAGACAACCTTCTGAATCTTCTGAG	
AGAGATAAAGTTCGCCGAAGAAAAACGACTCGTCTGTAAAGTGGGTTTCGG	1000
CTTACATAGCGACGAGGTTCTCCACCACAAACGTTTCAGGAAAACGATGTC	
AGAGAAAAAACGATAATTCAAATGTACAGCAGAAAGAAGAGAAGAAAGA	1100
AACGGTGAAGGCAAAGAAGAAAAACAGGAAGACAGCGAGTTCGAGAAAC	
GCTTCAAAGAACTCATGGAAGAACTGAAAGAAAAGGGCGATCTCTCTATC	1200
TTTGTGCTCTCAGCCTCTCAGAGGTGCAGTTTGACGGAGAAAAGGTGAT	
TATTTCTTTTGATTTCATCGAAAGCTATGCATTACGAGTTGATGAAGAAAA	1300
AACTGCCTGAGCTGGAAAACATTTTTTCTAGAAAACTCGGGAAAAAAGTA	
GAAGTTGAACCTCGACTGATGGGAAAAGAAGAAACAATCGAGAAGGTTTC	1400
TCAGAAGATCCTGAGATTGTTTGAACAGGAGGGA	

FIG. 58

MEVLYRKYPKTFSEVVNQDHVKKAIIGAIQKNSVAHGYYIFAGPRGTGKT	
TLARILAKSLNCENRKGVEPCNSCRACREIDEGTFMDVIELDAASNRGID	100
EIRRIDAVGYRPMEGKYKVYIIDEVHMLTKEAFNALLKTLEPPSHVVF	
VLATTNLEKVPPTIISRCQVFERNIPDELIEKRLQEVAAEGIEIDREA	200
LSFIAKRASGGLRDALTMLEQVWKFSEKIDLETVHRALGLIPIQVVRDY	
VNAIFSGDVKRVFTVLDDVYYSGKDYEVLIQEAVEDLVEDLERERGVYQV	300
SANDIVQVSRQLLNLLREIKFAEEKRLVCKVGSAYIATRFSTTNVQENDV	
REKNDNSNVQQKEEKETVKAKEEKQEDSEFEKRFKELMEELKEKGDLSI	400
FVALSLSEVQFDGEKVIISFDSSKAMHYELMKKKLPELENIFSRKLGKKV	
EVELRLMGKEETIEKVSQKILRLFEQEG	478

FIG. 59

ATGAAAGTAACCGTCACGACTCTTGAATTGAAAGACAAAATAACCATCGC	100
CTCAAAGCGCTCGCAAAGAAATCCGTGAAACCCATTCTTGCTGGATTTC	
TTTTCGAAGTGAAAGATGGAAATTTCTACATCTGCGCGACCGATCTCGAG	200
ACCGGAGTCAAAGCAACCGTGAATGCCGCTGAAATCTCCGGTGAGGCACG	
TTTTGTGGTACCAGGAGATGTCATTGAGAAGATGGTCAAGGTTCTCCCAG	300
ATGAGATAACGGAACCTTTCTTTAGAGGGGGATGCTCTTGTTATAAGTTCT	
GGAAGCACCGTTTTTCAGGATCACCACCATGCCCGCGGACGAATTTCCAGA	400
GATAACGCCTGCCGAGTCTGGAATAACCTTCGAAGTTGACACTTCGCTCC	
TCGAGGAAATGGTTGAAAAGGTCATCTTCGCCGCTGCCAAAGACGAGTTC	500
ATGCGAAATCTGAATGGAGTTTTCTGGGAACTCCACAAGAATCTTCTCAG	
GCTGGTTGCAAGTGATGGTTTCAGACTTGCACTTGCTGAAGAGCAGATAG	600
AAAACGAGGAAGAGGCGAGTTTCTTGCTCTCTTTGAAGAGCATGAAAGAA	
GTTCAAAACGTGCTGGACAACACAACGGAGCCGACTATAACGGTGAGGTA	700
CGATGGAAGAAGGGTTTCTCTGTGACAAATGATGTAGAAACGGTGATGA	
GAGTGGTTCGACGCTGAATTTCCCGATTACAAAAGGGTGATCCCCGAACT	800
TTCAAACGAAAGTGGTGGTTTCCAGAAAAGAACTCAGGGAATCTTTGAA	
GAGGGTGATGGTGATTGCCAGCAAGGGAAGCGAGTCCGTGAAGTTCGAAA	900
TAGAAGAAAACGTTATGAGACTTGTGAGCAAGAGCCCGGATTATGGAGAA	
GTGGTTCGATGAAGTTGAAGTTCAAAAAGAAGGGGAAGATCTCGTGATCGC	1000
TTTCAACCCGAAGTTCATCGAGGACGTTTTTGAAGCACATTGAGACTGAAG	
AAATCGAAATGAACTTCGTTGATTCTACCAGTCCATGTCAGATAAATCCA	1098
CTCGATATTTCTGGATACCTTTACATAGTGATGCCCATCAGACTGGCA	

FIG. 60

MKVTVTTLLELKDKITIASKALAKKSVKPILAGFLFEVKDGNFYICATDLE	100
TGVKATVNAAEISGEARFVVPDVIQKMVKVLPDEITELSLEGDALVISS	
GSTVFRITTMPADEFPPEITPAESGITFEVDTSLLEEMVEKVIFAAAKDEF	200
MRNLNGVFWELHKNLLRLVASDGFRLALAEQIENEEEASFLLSLKSMKE	
VQNVLDNTTEPTITVRYDGRRVSLSTNDVETVMRVVDAEFPDYKRVIPET	300
FKTKVVVSRKELRESLKRVMVIASKGSESVKFEIEENVMLRVSKSPDYGE	
VVDEVEVQKEGEDLVIAFNPKFIEDVLKHIEETEEIEMNFVDSTSPCQINP	366
LDISGYLYIVMPIRLA	

FIG. 61

ATGCCAGTCACGTTTCTCACAGGTA	CTGCAGAACTCAGAAGGAAGAATT	
GATAAAGAACTCCTGAAGGATGGTA	ACGTGGAGTACATAAGGATCCATC	100
CGGAGGATCCCGACAAGATCGATTT	CATAAGGTCTTTACTCAGGACAAAG	
ACGATCTTTTCCAACAAGACGATCAT	TGACATCGTCAATTTTCGATGAGTG	200
GAAAGCACAGGAGCAGAAGCGTCTC	GTGAACTTTTGAAAAACGTACCGG	
AAGACGTTCATATCTTCATCCGTTCT	CAAAAAACAGGTGGAAAGGGAGTA	300
GCGCTGGAGCTTCCGAAGCCATGGG	AAACGGACAAGTGGCTTGAGTGGAT	
AGAAAAGCGCTTCAGGGAGAATGGT	TTGCTCATCGATAAAGATGCCCTTC	400
AGCTGTTTTTCTCCAAGGTTGGAAC	GACGACCTGATCATAGAAAGGGAG	
ATTGAAAACTGAAAGCTTATTCCG	AGGACAGAAAGATAACGGTAGAAGA	500
CGTGGAAGAGGTCGTTTTTACCTAT	CAGACTCCGGGATACGATGATTTTT	
GCTTTGCTGTTTCCGAAGGAAAAAG	GAAAGCTCGCTCACTCTCTTCTGTCG	600
CAGCTGTGAAAACCAAGAGTCCGT	GGTGATTGCCACTGTCCTTGCGAA	
TCACTTCTTGGATCTCTTCAAAATC	CTCGTTCTTGTGACAAAGAAAAGAT	700
ACTACACCTGGCCTGATGTGTCCAG	GGTGTCCAAAGAGCTGGGAATTCCC	
GTTCTCTGTTGGCTCGTTTCCCTCG	GTTTCTCCTTTAAGACCTGGAAATT	800
CAAGGTGATGAACCACCTCCTCTAC	TACGATGTGAAGAAGGTTAGAAAGA	
TACTGAGGGATCTCTACGATCTGG	ACAGAGCCGTGAAAAGCGAAGAAGAT	900
CCAAAACCGTTCTTCCACGAGTTC	CATAGAAGAGGTGGCACTGGATGTATA	
TTCTCTTCAGAGAGATGAAGAA		972

FIG. 62

MPVTFLTGTAE	TQKEELIKLLK	DGNVEYIRIHP	EDPKIDFIRSL	LRTK	
TIFS	NKTIIDIVNF	DEWKAQEQRL	VELLKNVPED	VHIFIRSQKT	GGKGV 100
ALELPK	PWETDKWLE	WIEKRFR	ENGLLIDKDAL	QLFFSKVGT	NDLI IERE 200
IEKLKAY	SEDRKITVED	VEEVFTYQTP	GYDDFCFAV	SEGKRKL	LAHSLLS 300
QLWKT	TESVVIATV	LANHFLDLF	KILVLVTKK	RYTWP	DVSRVSKELGIP
VPRVAR	FLGFSFKT	WKFKVMN	HLLYDVK	KVRKILRD	LYDLDR
PKPFF	HEFIEE	VALDVYSL	QRDEE		

FIG. 63

ATGAACGATTTGATCAGAAAGTACGCTAAAGATCAACTGGAAACTTTGAA	100
AAGGATCATAGAAAAGTCTGAAGGAATATCCATCCTCATAAATGGAGAAG	
ATCTCTCGTATCCGAGAGAAGTATCCCTTGAACCTCCCGAGTACGTGGAG	200
AAATTTCCCCCGAAGGCCTCGGATGTTCTGGAGATAGATCCCGAGGGGGA	
GAACATAGGCATAGACGACATCAGAACGATAAAGGACTTCCTGAACTACA	300
GCCCCGAGCTCTACACGAGAAAGTACGTGATAGTCCACGACTGTGAAAGA	
ATGACCCAGCAGGCGGCGAACGCGTTTCTGAAGGCCCTTGAAGAACCACC	400
AGAATACGCTGTGATCGTTCTGAACACTCGCCGCTGGCATTATCTACTGC	
CGACGATAAAGAGCCGAGTGTTTCTGAGTGGTTGTGAACGTTCCAAAGGAG	500
TTCAGAGATCTCGTGAAAGAGAAAATAGGAGATCTCTGGGAGGAACTTCC	
ACTTCTTGAGAGAGACTTCAAAACGGCTCTCGAAGCCTACAACTTGGTG	600
CGGAAAAACTTTCTGGATTGATGGAAAGTCTCAAAGTTTTGGAGACGGAA	
AAACTCTTGAAAAAGGTCCTTTCAAAGGCCTCGAAGGTTATCTCGCATG	700
TAGGGAGCTCCTGGAGAGATTTTCAAAGGTGGAATCGAAGGAATTCTTTG	
CGCTTTTTTGATCAGGTGACTAACACGATAACAGGAAAAGACGCGTTTCTT	800
TTGATCCAGAGACTGACAAGAATCATTCTCCACGAAAACACATGGGAAAG	
CGTTGAAGATCAAAAAAGCGTGTCTTTCCTCGATTCAATTCTCAGGGTGA	900
AGATAGCGAATCTGAACAACAACTCACTCTGATGAACATCCTCGCGATA	
CACAGAGAGAGAAAGAGAGGTGTCAACGCTTGGAGC	

FIG. 64

MNDLIRKYAKDQLETLKRIIEKSEGISILINGEDLSYPREVSLELPEYVE	100
KFPPKASDVLEIDPEGENIGIDDIRTIKDFLNYSPELYTRKYVIVHDCER	
MTQQAANAFLKALEEPPEYAVIVLNTRRWHYLLPTIKSRVFRVVVNPKE	200
FRDLVKEKIGDLWEELPLLERDFKTALEAYKLGAEKLSGLMESLKVLETE	
LLLKKVLSKGLEGYLACRELLERFSKVESKEFFALFDQVTNTITGKDAFL	300
LIQRLTRIILHENTWESVEDKSVSFLDSILRVKIANLNNKLTLMNILAIH	
RERKRGVNAWS	

FIG. 65

ATGTCCTTCTTCAACAAGATCATACTCATAGGAAGACTCGTGAGAGATCC 100  
 CGAAGAGAGATACACGCTCAGCGGAACTCCAGTCACCACCTTCACCATAG  
 CGGTGGACAGGGTTCCCAGAAAGAACGCGCCGGACGACGCTCAAACGACT 200  
 GATTTCTTCAGGATCGTCACCTTTGGAAGACTGGCAGAGTTTCGCTAGAAC  
 CTATCTCACCAAAGGAAGGCTCGTTCTCGTCGAAGGTGAAATGAGAATGA 300  
 GAAGATGGGAAACACCCACTGGAGAAAAGAGGGTATCTCCGGAGGTTGTC  
 GCAAACGTTGTTAGATTCATGGACAGAAAACCTGCTGAAACAGTTAGCGA 400  
 GACTGAAGAGGAGCTGGAAATACCGGAAGAAGACTTTTCCAGCGATACCT  
 TCAGTGAAGATGAACCACCATT

FIG. 66

MSFFNKIILIGRLVRDPEERYTLGTPVTTFTIAVDRVPRKNAPDDAQT 100  
 DFRIVTFGRLAEFARTYLTGRLVLVEGEMRMRRWETPTGEKRVSPVV  
 ANVVRFMDRKPAETVSETEEELEIPEEDFSSDTFSEDEPPF

FIG. 67



ATGCGTGTTCCCCCGCACAACTTAGAGGCCGAAGTTGCTGTGCTCGGAAG	
CATATTGATAGATCCGTCGGTAATAAACGACGTTCTTGAAATTTTGAGCC	100
ACGAAGATTTCTATCTGAAAAAACACCAACACATCTTCAGAGCGATGGAA	
GAGCTTTACGACGAAGGAAAACCGGTGGACGTGGTTTCCGTCTGTGACAA	200
GCTTCAAAGCATGGGAAAACCTCGAGGAAGTAGGTGGAGATCTGGAAGTGG	
CCCAGCTCGCTGAGGCTGTGCCAGTTCTGCACACGCACTTCACTACGCG	300
GAGATCGTCAAGGAAAAATCCATTCTGAGGAAACTCATTGAGATCTCCAG	
AAAAATCTCAGAAAGTGCCTACATGGAAGAAGATGTGGAGATCCTGCTCG	400
ACAACGCAGAAAAGATGATCTTCGAGATCTCAGAGATGAAAACGACAAAA	
TCCTACGATCATCTGAGAGGCATCATGCACCGGGTGTGTTGAAAACCTGGA	500
GAACTTCAGGGAAAGAGCCAACCTTATAGAACCCGGTGTGCTCATAACGG	
GACTACCAACGGGATTCAAAGTCTGGACAAACAGACCACAGGGTTCCAC	600
AGCTCCGATCTGGTGATAATAGCAGCGAGACCCTCCATGGGAAAAACCTC	
CTTCGCACTCTCAATAGCGAGGAACATGGCTGTCAATTTGAAATCCCCG	700
TCGGAATATTCAGTCTCGAGATGTCCAAGGAACAGCTCGCTCAAAGACTA	
CTCAGCATGGAGTCCGGTGTGGATCTTTACAGCATCAGAACAGGATACCT	800
GGATCAGGAGAAGTGGGAAAGACTCACAATAGCGGCTTCTAAACTCTACA	
AAGCACCCATAGTTGTGGACGATGAGTCACTCCTCGATCCGCGATCGTTG	900
AGGGCAAAGCGAGAAGGATGAAAAAGAATACGATGTAAAAGCCATTTT	
TGTCGACTATCTCCAGCTCATGCACCTGAAAGGAAGAAAAGAAAGCAGAC	1000
AGCAGGAGATATCCGAGATCTCGAGATCTCTGAAGCTCCTTGCGAGGGAA	
CTCGACATAGTGGTGATAGCGCTTTCACAGCTTTCGAGGGCCGTTAGAACA	1100
GAGAGAAGACAAAAGACCGAGGCTGAGTGACCTCAGGGAATCCGGTGCGA	
TAGAACAGGACGCAGACACAGTCATCTTCATCTACAGGGAGGAATATTAC	1200
AGGAGCAAAAATCCAAAGAGGAAAGCAAGCTTCACGAACCTCACGAAGC	
TGAAATCATAATAGGTAAACAGAGAAACGGTCCCGTTGGAACGATCACTC	1300
TGATCTTCGACCCCAAGACGGTTACGTTCCATGAAGTCGATGTGGTGCAT	
TCA	1353

FIG. 68

MRVPPHNLEAEVAVLGSILIDPSVINDVLEILSHEDFYLLKKHQHIFRAME	
ELYDEGKPDVSVCDKLQSMGKLEEVGGDLEVAQLAEAVPSSAHALHYA	100
EIVKEKSILRKLIEISRKISESAYMEEDVEILLDNAEKMIFEISEMKTTK	
SYDHLRGIMHRVFENLENFRERANLIEPGVLITGLPTGFKSLDKQTTGFH	200
SSDLVIAARPSMGKTSFALSIARNMAVNFEIPVGIFSLEMSKEQLAQR	
LSMESGVDLYSIRTGYLDQEKWERLTIAASKLYKAPIVDDDESLLDPRSL	300
RAKARMKKEYDVKAIFVDYLQLMHLKGRKESRQOEISEISRSLKLLARE	
LDIVVIALSQLSRAVEQREDKRPRLSDLRESGAIEQDADTVIFIYREEYY	400
RSKKSKEESKLHEPHEAEIIIGKQRNGPVGTITLIFDPRTVTFHEVDVH	
S	451

FIG. 69

GTGATTCCTCGAGAGGTCATCGAGGAAATAAAAAGAAAGGTTGACATCGT	100
AGAGGTCATTTCCGAGTACGTGAATCTTACCCGGGTAGGTTCTCTCTACA	
GGGCTCTCTGTCCCTTTCATTTCAGAAACCAATCCTTCTTTCTACGTTTCAT	200
CCGGGTTTGAAGATATACCATTGTTTTCGGCTGCGGTGCGAGTGGAGACGT	
CATCAAATTTCTTCAAGAAATGGAAGGGATCAGTTTCCAGGAAGCGCTGG	300
AAAGACTTGCCAAAAGAGCTGGGATTGATCTTTCTCTCTACAGAACAGAA	
GGGACTTCTGAATACGGAATAACATTTCGTTTGTACGAAGAAACGTGGAA	400
AAGGTACGTCAAAGAGCTGGAGAAATCGAAAGAGGCAAAAGACTATTTAA	
AAAGCAGAGGCTTCTCTGAAGAAGATATAGCAAAGTTTCGGCTTTGGGTAC	500
GTCCCCAAGAGATCCAGCATCTCTATAGAAGTTGCAGAAGGCATGAACAT	
AACACTGGAAGAACTTGTGAGATACGGTATCGCGCTGAAAAAGGGTGATC	600
GATTTCGTTGATAGATTTCGAAGGAAGAATCGTTGTTCCAATAAAGAACGAC	
AGTGGTCATATTGTGGCTTTTGGTGGGCGTGCTCTCGGCAACGAAGAACC	700
GAAGTATTTGAACTCTCCAGAGACCAGGTATTTTTTCGAAGAAGAAGACCC	
TTTTTCTCTTCGATGAGGCGAAAAAGTGGCAAAAGAGGTTGGTTTTTTC	800
GTCAACACCGAAGGCTACTTCGACGCGCTCGCATTCAGAAAGGATGGAAT	
ACCAACGGCGGTGCTGTTCTTGGGGCGAGTCTTTCAGAGAGGCGATTC	900
TAAAACTTTTCGGCGTATTCGAAAAACGTCATACTGTGTTTCGATAATGAC	
AAAGCAGGCTTCAGAGCCACTCTCAAATCCCTCGAGGATCTCCTAGACTA	1000
CGAATTCAACGTGCTTGTGGCAACCCCTCTCCTTACAAAGACCCAGATG	
AACTCTTTCAGAAAGAAGGAGAAGGTTTCATTGAAAAAGATGCTGAAAAAC	1100
TCGCGTTTCGTTTCGAATATTTTCTGGTGACGCGCTGGTGAGGTCTTCTTTGA	
CAGGAACAGCCCCGCGGTGTGAGATCCTACCTTTCTTTCTCCTCAAAGGTT	1200
GGGTCCAAAAGATGAGAAGGAAAGGATATTTGAAACACATAGAAAATCTC	
GTGAATGAGGTTTCATCTTCTCTCCAGATACCAGAAAACCAGATTTTGAA	1300
CTTTTTTTGAAAGCGACAGGTCTAACACTATGCCTGTTTCATGAGACCAAGT	
CGTCAAAGGTTTACGATGAGGGGAGAGGACTGGCTTATTTGTTTTTGAAC	1400
TACGAGGATTTGAGGGAAAAGATTCTGGAACCTGGACTTAGAGGTACTGGA	
AGATAAAAACGCGAGGGAGTTTTTCAAGAGAGTCTCACTGGGAGAAGATT	1500
TGAACAAAGTCATAGAAAACCTTCCCAAAGAGCTGAAAGACTGGATTTTTT	
GAGACAATAGAAAGCATTCTCTCTCCAAAGGATCCCGAGAAATTCCTCGG	1600
TGACCTCTCCGAAAAGTTGAAAATCCGACGGATAGAGAGACGTATCGCAG	
AAATAGATGATATGATAAAGAAAGCTTCAAACGATGAAGAAAGGCGTCTT	1695
CTTCTCTCTATGAAAGTGGATCTCCTCAGAAAAATAAAGAGGAGG	

FIG. 70

MIPREVIEEIKEKVDIVEVISEYVNLTRVGSSYRALCPFHSETNPSFYVH	
PGLKIYHCFGCGASGDVIKFLQEMEGISFQEALERLAKRAGIDLSLYRTE	100
GTSEYGKYIRLYEETWKRYVKELEKSKEAKDYLSRGFSEEDIAKFGFGY	
VPKRSSISIEVAEGMNITLEELVRYGIALKKGDRFVDRFEGRIVVPIKND	200
SGHIVAFGGRALGNEEPKYLNSPETRYFSKKKTLFLFDEAKKVAKEVGFF	
VITEGYFDALAFRKDGIPTAVAVLGASLSREAILKLSAYSKNVILCFDND	300
KAGFRATLKSLEDLLDYEFNVLVATPSPYKDPDELFOKEGEGSLKKMLKN	
SRSFEYFLVTAGEVFFDRNSPAGVRSYLSFLKGWVQKMRRKGYLKHIE	400
NVNEVSSSLQIPENQILNFFESDRSNTMPVHETKSSKVYDEGRGLAYLFLN	
YEDLREKILELDLEVLLEDKNAREFFKRVSLGEDLNKVIENFPKELKDWF	500
ETIESIPPPKDPEKFLGDLSEKLKIRRIERRIAEIDDMIKKASNDEERRL	
LLSMKVDLLRKKIKRR	565

FIG. 71

ATGGCTCTACACCCGGCTCACCCCTGGGGCAATAATCGGGCACGAGGCCGT	
TCTCGCCCTCCTTCCCCGCCTCACCGCCAGACCCTGCTCTTCTCCGGCC	100
CCGAGGGGGTGGGGCGGCGCACCGTGGCCCGCTGGTACGCCTGGGGGCTC	
AACCGCGGCTTCCCCCGCCCTCCCTGGGGGAGCACCGGACGTCCTCGA	200
GGTGGGGCCCAAGGCCCGGGACCTCCGGGGCCGGGCGGAGGTGCGGCTGG	
AGGAGGTGGCGCCCTCTTGAGTGGTGCTCCAGCCACCCCGGGAGCGG	300
GTGAAGGTGGCCATCCTGGACTCGGCCACCTCCTCACCGAGGCCGCCGC	
CAACGCCCTCCTCAAGCTCCTGGAGGAGCCCCCTTCTACGCCCGCATCG	400
TCCTCATCGCCCCAAGCCGCGCCACCCTCCTCCCCACCCTGGCCTCCCGG	
GCCACGGAGGTGGCATTGCCCCCGTGCCCGAGGAGGCCCTGCGCGCCCT	500
CACCCAGGACCCGGAGCTCCTCCGCTACGCCGCGGGGCCCCGGGCCGCC	
TCCTTAGGGCCCTCCAGGACCCGGAGGGGTACCGGGCCCGCATGGCCAGG	600
GCGCAAAGGGTCTGAAAGCCCCGCCCTGGAGCGCCTCGCTTTGCTTCG	
GGAGCTTTTGGCCGAGGAGGAGGGGTCCACGCCCTCCACGCCGTCTTAA	700
AGCGCCCGGAGCACCTCCTTGCCCTGGAGCGGGCGCGGGAGGCCCTGGAG	
GGGTACGTGAGCCCCGAGCTGGTCCTCGCCGGCTGGCCTTAGACTTAGA	800
GACA	

FIG. 72

MALHPAHPGAIIGHEAVLALLPRLTAQTLLFSGPEGVGRRTVARWYAWGL	
NRGFPPPSLGEHPDVLEVGPKARDLRGRAEVRL EEVAPLLEWCSSHPRER	100
VKVAILDSAHLLTEAAANALLKLL EEPSPYARIVLIAPS RATLLPTLASR	
ATEVAFAPVPEEALRALTQDPELLRYAAGAPGRLLRALQDPEGYRARMAR	200
AQRVLKAPPLERLALLRELLAEEEGVHALHAVLKRPEHLLALERAREALE	
GYVSPELVLARLALDLET	268

FIG. 73

ATGCTGGACCTGAGGGAGGTGGGGGAGGCGGAGTGGAAGGCCCTAAAGCC	100
CCTTTTGGAAAGCGTGCCCGAGGGCGTCCCCGTCTCCTCCTGGACCCTA	
AGCCAAGCCCCTCCCGGGCGGCCTTCTACCGGAACCGGGAAAGGCGGGAC	200
TTCCCCACCCCCAAGGGGAAGGACCTGGTGC GGACCTGGAAAACCGGGC	
CAAGCGCCTGGGGCTCAGGCTCCCGGGCGGGGTGGCCAGTACCTGGCCT	300
CCCTGGAGGGGGACCTCGAGGCCCTGGAGCGGGAGCTGGAGAAGCTTGCC	
CTCCTCTCCCCACCCCTCACCTGGAGAAGGTGGAGAAGGTGGTGGCCCT	400
GAGGCCCCCCTCACGGGCTTTGACCTGGTGCCTCCGTCTTGGAGAAGG	
ACCCCAAGGAGGCCCTCCTGCGCCTAGGCGGCCTCAAGGAGGAGGGGGAG	500
GAGCCCCTCAGGCTCCTCGGGGCCCTCTCCTGGCAGTTCGCCCTCCTCGC	
CCGGGCCTTCTTCTCCTCCGGGAAAACCCCAAGGAGGAGGACC	600
TCGCCCCGCTCGAGGCCCACCCCTACGCCGCCCGCCGCGCCCTGGAGGCG	
GCGAAGCGCCTCACGGAAGAGGCCCTCAAGGAGGCCCTGGACGCCCTCAT	700
GGAGGCGGAAAAGAGGGCCAAGGGGGGAAAGACCCGTGGCTCGCCCTGG	
AGGCGGCGGTCTCCGCTCGCCCGTTGA	

FIG. 74

MVIAFTGDPFLAREALLEEARLRGLSRFTEPTPEALAQALAPGLFGGGGA	100
MLDLREVGEAEWKALKPLLESVPEGVPVLLLDPKPSPSRAAFYRNRERRD	
FPTPKGKDLVRHLENRAKRLGLRLPGGVAQYLASLEGDLEALERELEKLA	200
LLSPPLTLEKVEKVVALRPPLTGFDLVRVLEKDPKEALLRLGGLKEEGE	
EPLRLLGALSWQFALLARAFFLLRENPRPKEEDLARLEAHPYAARRALEA	292
AKRLTEEALKEALDALMEAEKRAKGKDPWLALEAAVLRLAR	

FIG. 75

ATGGCTCGAGGCCTGAACCGCGTTTTCTCATCGGCGCCCTCGCCACCCG	100
GCCGGACATGCGCTACACCCCGCGGGGCTCGCCATTTTGGACCTGACCC	
TCGCCGGTCAGGACCTGCTTCTTTCCGATAACGGGGGGGAACCGGAGGTG	200
TCCTGGTACCACCGGGTGAGGCTCTTAGGCCGCCAGGCGGAGATGTGGGG	
CGACCTCTTGGACCAAGGGCAGCTCGTCTTCGTGGAGGGCCGCCTGGAGT	300
ACCGCCAGTGGGAAAGGGAGGGGGAGAAGCGGAGCGAGCTCCAGATCCGG	
GCCGACTTCCGGACCCCTGGACGACCGGGGGAAGAAGCGGGCGGAGGAC	400
AGCCGGGGCCAGCCAGGCTCCGCGCCGCCCTGAACCAGGTCTTCCTCAT	
GGGCAACCTGACCCGGGACCCGGAACCTCCGCTACACCCCCAGGGCACCG	500
CGGTGGCCCGGCTGGGCCTGGCGGTGAACGAGCGCCGCCAGGGGGCGGAG	
GAGCGCACCCACTTCGTGGAGGTTAGGCCTGGCGCGACCTGGCGGAGTG	600
GGCCGCCGAGCTGAGGAAGGGCGACGGCCTTTTCGTGATCGGCAGGTTGG	
TGAACGACTCCTGGACCAGCTCCAGCGGCGAGCGGCGCTTCCAGACCCGT	700
GTGGAGGCCCTCAGGCTGGAGCGCCCCACCCGTGGACCTGCCCAGGCCTG	
CCCAGGCCGCGGGAACAGGTCCCGCGAAGTCCAGACGGGTGGGGTGGACA	800
TTGACGAAGGCTTGGAAGACTTTCCGCCGGAGGAGGATTTGCCGTTTTGA	
GCACGAA	

FIG. 76

MARGLNRVFLIGALATRPDMRYTPAGLAILDLTLAGQDLLLSDNNGGEPEV	100
SWYHRVRLLRQAEMWGDLLDQGQLVFVEGRLEYRQWEREGEKRSELQIR	
ADFLDPLDDRKGKRAEDSRGQPRRLRAALNQVFLMGNLTRDPELRYTPQGT	200
AVARLGLAVNERRQGAERTHFVEVQAWRDLAEWAAELRKGDGLFVIGRL	
VNDSWTSSSGERRFQTRVEALRLERPTRGPAQACPGRRNRSREVQTGGVD	266
IDEGLEDFPPEEDLPF	

FIG. 77

AATTCGACATTTCAATTGAATCGTTTATTCCGCTTGAAAAAGAAGGCAA	
GTTGCTCGTTGATGTGAAAAGACCGGGGAGCATCGTACTGCAGGCGCGCT	100
TTTTCTCTGAAATCGTGAAAAAACTGCCGCAACAAACGGTGGAATCGAA	
ACGGAAGACAACTTTTTGACGATCATCCGCTCGGGGCACTCAGAATTCCG	200
CCTCAATGGGCTAAACGCCGACGAATATCCGCGCCTGCCGCAAATTGAAG	
AAGAAAACGTGTTTCAAATCCCGGCTGATTTATTGAAAACCGTGATTCCG	300
CAAACGGTGTTTCGCCGTTTCTACATCGGAAACGCGCCCAATCTTGACAGG	
TGTCAACTGGAAAGTTGAACATGGCGAGCTTGTCTGCACAGCGACCGACA	400
GTCATCGCTTAGCCATGCGCAAAGTGAAAATTGAGTCGGAAAATGAAGTA	
TCATAAACGTCGTCATCCCTGGAAAAAGTCTTAATGAGCTCAGCAAAAT	500
TTTGATGACGGCAACCACCGGTGGACATCGTCATGACAGCCAATCAAG	
TGCTATTTAAGGCCGAGCACCTTCTCTTTTCCCGGCTGCTTGACGGC	600
AACATCCGGAGACGGCCCGCTTGATTCCAACAGAAAGCAAACGACCAT	
GATCGTCAATGCAAAGAGTTTCTGCAGGCAATCGACCGAGCGTCCTTGC	700
TTGCTCGAGAAGGAAGGAACAACGTTGTGAAACTGACGACGCTTCCTGGA	
GGAATGCTCGAAATTTCTTCGATTTCTCCGAGATCGGGAAAGTGACGGAG	800
CAGCTGCAAACGGAGTCTCTTGAAGGGGAAGAGTTGAACATTTTCGTTTCA	
CGCGAAATATATGATGGACGCGTTGCGGGCGCTTGATGGAACAGACATTT	900
CAAATCAGCTTCACTGGGGCCATGCGGCCGTTCTGTGCGCCCGCTTCA	
ACCGATTGATGCTTCAGCTCATTTTGCCGGTGAGAACATAT	992

FIG. 78

NSDISIIESFIPLEKEGKLLVDVKRPGSIVLQARFFSEIVKKLPQQTVEI	
ETEDNFLTIIRSGHSEFRLNGLNADEYPRLPQIEEENVFQIPADLLKTVI	100
RQTVFAVSTSETRPILTGVDNWKVEHGELVCTATDSHRLAMRKVKIIESEN	
EVSYNVVI PGKSLNELSKIILDDGNHPVDIVMTANQVLFKAEHLLFFSRL	200
LDGNYPETARLIPTESKTTMIVNAKEFLQAIDRASLLAREGRNNVVKLTT	
LPGGMLEISSISPEIGKVTEQLQTESLEGEELNISFSAKYMMDALRALDG	300
TDIQISFTGAMRPFLRLPLHTDSMLQLILPVRTY	

FIG. 79

ATGATTAACCGCGTCATTTTGGTCGGCAGGTTAACGAGAGATCCGGAGTT	
GCGTTACACTCCAAGCGGAGTGGCTGTTGCCACGTTTACGCTCGCGGTCA	100
ACCGTCCGTTTACAAATCAGCAGGGCGAGCGGGAAACGGATTTTATTCAA	
TGTGTCGTTTGGCGCCGCCAGGCGGAAAACGTCGCCAACTTTTGGAAAA	200
GGGGAGCTTGGCTGGTGTGCGATGGCCGACTGCAAACCCGCAGCTATGAAA	
ATCAAGAAGGTCGGCGTGTGTACGTGACGGAAGTGGTGGCTGATAGCGTC	300
CAATTTCTTGAGCCGAAAGGAACGAGCGAGCAGCGAGGGGCGACAGCAGG	
CGGCTACTATGGGGATCCATTCCCATTTCGGGCAAGATCAGAACCACCAAT	400
ATCCGAACGAAAAAGGGTTTGGCCGCATCGATGACGATCCTTTCGCCAAT	
GACGGCCAGCCGATCGATATTTCTGATGATGATTTGCCGTTT	492

**FIG. 80**

MINRVILVGRLTRDPELRYTPSGVAVATFTLAVNRPFTNQSYENQEGRRV	
YVTEVVADSVQFLEPKGTSEQRGATAGGYQGERETDFIQCVVWRRQAEN	100
VANFLKKGSLAGVDGRLQTRGDPFPFGQDQNHQYPNEKGFGRIDDDPFAN	
DGQPIDISDDDLPF	164

**FIG. 81**

ATGCTGGAACGCGTATGGGGAAACATTGAAAAACGGCGTTTTTCTCCCCT	
TTATTTATTATACGGCAATGAGCCGTTTTTATTAACGGAAACGTATGAGC	100
GATTGGTGAACGCAGCGCTTGGCCCCGAGGAGCGGGAGTGGAACCTGGCT	
GTGTACGACTGCGAGGAAACGCCGATCGAGGCGGCGCTTGAGGAGGCCGA	200
GACGGTGCCGTTTTTTCGGCGAGCGGCGTGTCATTCTCATCAAGCATCCAT	
ATTTTTTTACGTCTGAAAAAGAGAAGGAGATCGAACATGATTTGGCGAAG	300
CTGGAGGCGTACTTGAAGGCGCCGTCGCCGTTTTTCGATCGTCGTCTTTTT	
CGCGCCGTACGAGAAGCTTGATGAGCGAAAAAAATTACGAAGCTCGCCA	400
AAGAGCAAAGCGAAGTCGTCATCGCCGCCCGCTCGCCGAAGCGGAGCTG	
CGTGCTTGGGTGCGGCGCCGCATCGAGAGCCAAGGGGCGCAAGCAAGCGA	500
CGAGGCGATTGATGTCCTGTTGCGGCGGGCCGGGACGCAGCTTTCGCCT	
TGGCGAATGAAATCGATAAATTGGCCCTGTTTGCCGGATCGGGCGGAACC	600
ATCGAGGCGGCGGCGGTTGAGCGGCTTGTCGCCCGCACGCCGGAAGAAAA	
CGTATTTGTGCTTGTCGAGCAAGTGCGGAAGCGCGACATTCCAGCAGCGT	700
TGCAGACGTTTTTATGATCTGCTTGAAAACAATGAAGAGCCGATCAAAATT	
TTGGCGTTGCTCGCCGCCCATTTCCGCTTGCTTTCGCAAGTGAAATGGCT	800
TGCCTCCTTAGGCTACGGACAGGCGCAAATTGCTGCGGCGCTCAAGGTGC	
ACCGTTCCGCGTCAAGCTCGCTCTTGCTCAAGCGGCCCGCTTCGCTGAC	900
GGAGAGCTTGCTGAGGCGATCAACGAGCTCGCTGACGCCGATTACGAAGT	
GAAAAGCGGGGCGGTCGATCGCCGGTTGGCCGTTGAGCTGCTTCTGATGC	1000
GCTGGGGCGCCCCGCCCGGCGCAAGCGGGGCGCCACGGCCGGCGG	

FIG. 82

MLERVWGNIEKRRFSPLYLLYGNEPFLLTETYERLVNAALGPEEREWNLA	
VYDCEETPIEAALAEAETVPFFGERRVILIKHPYFFTSEKEKEIEHDLAK	100
LEAYLKAPSPFSIVVFFAPYEKLDERKKITKLAKEQSEVVIAAPLAEDEL	
RAWVRRRIESQGAQASDEAIDVLLRRAGTQLSALANEIDKLALFAGSGGT	200
IEAAVERLVARTPEENVFVLVEQVAKRDI PAALQTFYDLLENNEEPIKI	
LALLAAHFRLLSQVKWLASLGYGQAQIAAALKVHPFRVKLALAQAARFAD	300
GELAEAINELADADYEKSGAVDRRLAVELLMLRWGARPAQAGRHGR	

FIG. 83



ATGCGATGGGAACAGCTAGCGAAACGCCAGCCGGTGGTGGCGAAAATGCT	
GCAAAGCGGCTTGGA AAAAGGGCGGATTTCTCATGCGTACTTGTTTGAGG	100
GGCAGCGGGGGACGGGCAAAAAGCGGCCAGTTTGTGTGTTGGCGAAACGT	
TTGTTTTGTCTGTCCCAATCGGAGTTTCCCGTGTCTAGAGTGCCGCAA	200
CTGCCGGCGCATCGACTCCGGCAACCACCCTGACGTCCGGGTGATCGGCC	
CAGATGGAGGATCAATCAAAAAGGAACAAATCGAATGGCTGCAGCAAGAG	300
TTCTCGAAAACAGCGGTGCGAGTCGGATAAAAAAATGTACATCGTTGAGCA	
CGCCGATCAAATGACGACAAGCGCTGCCAACAGCCTTCTGAAATTTTTGG	400
AAGAGCCGCATCCGGGGACGGTGGCGGTATTGCTGACTGAGCAATACCAC	
CGCCTGCTAGGGACGATCGTTTCCCGCTGTCAAGTGCTTTCGTTCCGGCC	500
GTTGCCGCCGGCAGAGCTCGCCCAGGGACTTGTCGAGGAGCACGTGCCGT	
TGCCGTTGGCGCTGTTGGCTGCCCATTTGACAAACAGCTTCGAGGAAGCA	600
CTGGCGCTTGCCAAAGATAGTTGGTTTGCCGAGGCGCGAACATTAGTGCT	
ACAATGGTATGAGATGCTGGGCAAGCCGGAGCTGCAGCTTTTGT TTTTCA	700
TCCACGACCGCTTGTTTCCGCATTTTTTGGAAGCCATCAGCTTGACCTT	
GGACTTG	757

FIG. 84

MRWEQLAKRQPVVAKMLQSGLEKGRISHAYLFEGQRGTGKKAASLLAKR	
LFCLSPIGVSPCLECRNCRRIDSGNHPDVRVIGPDGGS IKKEQIEWLQQE	100
FSKTAVESDKKMYIVEHADQMTTSAANSLLKFLEEPHPGTVAVLLTEQYH	
RLLGTVSRQVLSFRPLPPAELAQGLVEEHVPLPLALLAAHLTNSFEEA	200
LALAKDSWFAEARTLVLQWYEMLGKPELQLLFFIHDRLPHPFLESHQLDL	
GL	252

FIG. 85

GTGGCATACCAAGCGTTATATCGCGTGTTTCGGCCGCAGCGCTTTGCGGA	100
CATGGTTCGGCCAAGAACACGTGACCAAGACGTTGCAAAGCGCCCTGCTTC	
AACATAAAATATCGCACGCTTACTTATTTTCCGGCCCCGCGCGGTACAGGA	200
AAAACGAGCGCAGCGAAAATTTTCGCCAAGGCGGTCAACTGTGAACAGGC	
GCCAGCGGCGGAGCCATGCAATGAGTGTCCAGCTTGCCCTCGGCATTACGA	300
ATGGAACGGTTCCCGATGTGCTGGAAATTGACGCTGCTTCCAACAACCGC	
GTCGATGAAATTCGTGATATCCGTGAGAAGGTGAAATTTGCGCCAACGTC	400
GGCCCCGCTACAAAGTGTATATCATCGACGAGGTGCATATGCTGTGATCG	
GTGCGTTTAAACGCGCTGTTGAAAACGTTGGAGGAGCCGCCGAAACACGTC	500
ATTTTCATTTTGGCCACGACCGAGCCGCACAAAATTCGGGCGACGATCAT	
TTCCCGCTGCCAACGGTTCGATTTTCGCCGCATCCCGCTTCAGGCGATCG	600
TTTCACGGCTAAAGTACGTGCAAGCGCCCAAGGTGTCGAGGCGTCAGAT	
GAGGCATTGTCCGCCATCGCCCGTGCTGCAGACGGGGGGATGCGCGATGC	700
GCTCAGCTTGCTTGATCAAGCCATTTGCTTCAGCGACGGGAAACTTCGGC	
TCGACGACGTGCTGGCGATGACCGGGGCTGCATCATTTGCCGCCTTATCG	800
AGCTTCATCGAAGCCATCCACCGCAAAGATACAGCGGCGGTTCTTCAGCA	
CTTGGAACGATGATGGCGCAAGGGAAGATCCGCATCGTTTGGTTGAAG	900
ACTTGATTTTGTACTATCGCGATTTATTGCTGTACAAAACCGCTCCCTAT	
GTGGAGGGAGCGATTCAAATTGCTGTGCTTGACGAAGCGTTCACTTCACT	1000
GTCGGAAATGATTCCGGTTTCCAATTTATACGAGGCCATCGAGTTGCTGA	
ACAAAAGCCAGCAAGAGATGAAGTGGACAAACCACCCGCGCCTTCTGTTG	1100
GAAGTGGCGCTTGTGAAACTTTGCCATCCATCAGCCGCCGCCCCGTCGCT	
GTCGGCTTCCGAGTTGGAACCGTTGATAAAGCGGATTGAAACGCTGGAGG	1200
CGGAATTGCGGCGCCTGAAGGAACAACCGCCTGCCCTCCGTCGACCGCC	
GCGCCGGTGAAAAAAGTGTCCAAACCGATGAAAACGGGGGGATATAAAGC	1300
CCCGGTTGGCCGCATTTACGAGCTGTTGAAACAGGCGACGCATGAAGATT	
TAGCTTTGGTGAAAGGATGCTGGGCGGATGTGCTCGACACGTTGAAACGG	1400
CAGCATAAAGTGTGCGACGCTGCCTTGCTGCAAGAGAGCGAGCCGGTTGC	
AGCGAGCGCCTCAGCGTTTGTATTAAAATTCAAATACGAAATCCACTGCA	1500
AAATGGCGACCGATCCCACAAGTTCGGTCAAAGAAAACGTCGAAGCGATT	
TTGTTTGAGCTGACAAACCGCCGCTTTGAAATGGTAGCCATTCCGGAGGG	1600
AGAATGGGGAAAAATAAGAGAAGAGTTCATCCGCAATAAGGACGCCATGG	
TGGAAAAAAGCGAAGAAGATCCGTTAATCGCCGAAGCGAAGCGGCTGTTT	1677
GGCGAAGAGCTGATCGAAATTAAAGAA	

FIG. 86

VAYQALYRVFRPQRFADMVGQEHVTKTLQSALLQHKISHAYLFSGPRGTG	
KTSAAKIFAKAVNCEQAPAAEPCNECPACLGITNGTVPDVLEIDAASNNR	100
VDEIRDIREKVKFAPTSARYKVYIIDEVHMLSIGAFNALLKTLEPPKHV	
IFILATTEPHKIPATIIISRCQRFDFRRIPLQAIVSRLKYVASAQGVEASD	200
EALSAIARAADGGMRDALSLDQAISFSDGKLRLDDVLAMTGAASFAALS	
SFIEAIHRKDTAAVLQHLETMMAQGKDPHRLVEDLILYYRDLILLYKTAPY	300
VEGAIQIAVVDEAFTSLSEMI PVS NLYEAI ELLNKSQQEMKWTNHPRLLL	
EVALVKLCHPSAAAPSL SASELEPLIKRIETLEAELRRLKEQPPAPPSTA	400
APVKKLSKPMKTGGYKAPVVGRIYELLKQATHEDLALVKGCWADVLDTLKR	
QHKVSHAALLQESEPVAASASAFVLKFKYEIHCKMATDPTSSVKENVEAI	500
LFELTNRRFEMVAIPEGEWGKIREEFIRNKDAMVEKSEEDPLIAEAKRLF	
GEELIEIKE	559

FIG. 87

ATGGTGACAAAAGAGCAAAAAGAGCGGTTTCTCATCCTGCTTGAGCAGCT	100
GAAGATGACGTCGGACGAATGGATGCCGCATTTTCGTGAGGCAGCCATTC	
GCAAAGTCGTGATCGATAAAGAGGAGAAAAGCTGGCATTTTTATTTTCAG	200
TTTCGACAACGTGCTGCCGGTTCATGTATACAAAACGTTTGCCGATCGGCT	
GCAGACGGCGTTCCGCCATATCGCCGCCGTCCGCCATACGATGGAGGTCG	300
AAGCGCCGCGCGTAAGTGAAGGCGGATGTGCAGGCGTATTGGCCGCTTTGC	
CTTGCCGAGCTGCAAGAAGGCATGTGCGCCGCTTGTCGATTGGCTCAGCCG	400
GCAGACGCCTGAGCTGAAAGGAAACAAGCTGCTTGTCGTTGCCCGCCATG	
AAGCGGAAGCGCTGGCGATCAAACGGCGGTTCCGCCAAAAAATCGCTGAT	500
GTGTACGCTTCGTTTGGGTTTCCCCCCTTCAGCTTGACGTCAGCGTCGA	
GCCGTCCAAGCAAGAAATGGAACAGTTTTTGGCGCAAAACAGCAAGAGG	600
ACGAAGAGCGAGCGCTTGCTGTACTGACCGATTTAGCGAGGGAAGAAGAA	
AAGGCCGCGTCTGCGCCGCCGTCCGGTCCGCTTGTCATCGGCTATCCGAT	700
CCGCGACGAGGAGCCGGTGCGGCGGCTTGAAACGATCGTCGAAGAAGAGC	
GGCGCGTCGTTGTGCAAGGCTATGTATTTGACGCCGAAGTGAGCGAATTA	800
AAAAGCGGCCGACGCTGTTGACCATGAAAATCACAGATTACACGAAGTC	
GATTTTAGTCAAAATGTTCTCGCGCGACAAAGAGGACGCCGAGCTTATGA	900
GCGGCGTCAAAAAAGGCATGTGGGTGAAAGTGCGCGGCAGCGTGCAAAAC	
GATACGTTTCGTCCGTGATTTGGTCATCATCGCCAACGATTTGAACGAAAT	1000
CGCCGCAAACGAACGGCAAGATACGGCGCCGGAAGGGGAAAAGAGGGTTCG	
AGCTCCATTTGCATACCCCGATGAGCCAAATGGACGCGGTACCTCGGTG	1100
ACAAAATCATTGAGCAAGCGAAAAAATGGGGGCATCCGGCGATCGCCGT	
CACCGACCATGCCGTTGTTCAAGTCGTTTCCGGAGGCCTACAGCGCGGCGA	1200
AAAAACACGGCATGAAGGTCATTTACGGCCTTGAGGCGAACATCGTCGAC	
GATGGCGTGCCGATCGCCTACAATGAGACGCACCGCCGTCTTTCGGAGGA	1300
AACGTACGTCGTCTTTGACGTCGAGACGACGGGCCTGTCGGCTGTGTACA	
ATACGATCATTGAGCTGGCGGCGGTGAAAGTGAAAGACGGCGAGATCATC	1400
GACCGATTCATGTCGTTTGCCAACCCTGGACATCCGTTGTCGGTGACAAC	
GATGGAGCTGACTGGGATCACCGATGAGATGGTGAAAGACGCCCCGAAGC	1500
CGGACGAGGTGCTAGCCCGTTTTGTTGACTGGGCGGCGATGCGACGCTT	
GTTGCCACAAACGCCAGCTTTGACATCGGTTTTTTAAACGCGGGCCTCGC	1600
TCGCATGGGGCGCGGCAAAATCGCGAATCCAGTCATCGATACGCTCGAGC	
TGGCCCGTTTTTTATACCCGGATTTGAAAAACCATCGGCTCAATACATTG	1700
TGCAAAAAATTTGACATTGAATTGACGCAGCATACCGCGCCATCTACGA	
CGCGGAGGCGACCGGGCATTTGCTTATGCGGCTGTTGAAGGAAGCGGAAG	1800
AGCGCGGCATACTGTTTCATGACGAATTAAACAGCCGCACGCACAGCGAA	
GCGTCCTATCGGCTTGCGCGCCCGTTCCATGTGACGCTGTTGGCGCAAAA	1900
CGAGACTGGATTGAAAAATTTGTTCAAGCTTGTTGTCATTGTGCGACATTC	
AATATTTTCACCGTGTGCCGCGCATCCCGCGCTCCGTGCTCGTCAAGCAC	2000
CGCGACGGCCTGCTTGTCGGCTCGGGCTGCGACAAAGGAGAGCTGTTTGA	
CAACTTGATCCAAAAGGCGCCGGAAGAAGTCGAAGACATCGCCCGTTTTT	2100
ACGATTTTCTTGAAGTGCATCCGCCGACGTGTACAAGCCGCTCATCGAG	
ATGGATTATGTGAAAGACGAAGAGATGATCAAAAACATCATCCGCAGCAT	2200
CGTCGCCCTTGGTGAGAAGCTTGACATCCCGGTTGTCGCCACTGGCAACG	

FIG. 88A

TCCATTACTTGAACCCAGAAGATAAAATTTACCGGAAAATCTTAATCCAT  
TCGCAAGGCGGGGCGAATCCGCTCAACCGCCATGAACTGCCGGATGTATA 2300  
TTTCCGTACGACGAATGAAATGCTTGACTGCTTCTCGTTTTTAGGGCCGG  
AAAAAGCGAAGGAAATCGTCGTTGACAACACGCAAAAAATCGCTTCGTTA 2400  
ATCGGCGATGTCAAGCCGATCAAAGATGAGCTGTATACGCCGCGCATTGA  
AGGGGCGGACGAGGAAATCAGGGAAATGAGCTACCGGCGGGCGAAGGAAA 2500  
TTTACGGCGACCCGTTGCCGAACTTGTTGAAGAGCGGCTTGAGAAGGAG  
CTAAAAAGCATCATCGGCCATGGCTTTGCCGTCATTTATTTGATCTCGCA 2600  
CAAGCTTGTGAAAAAATCGCTCGATGACGGCTACCTTGTCGGGTTCGCGCG  
GATCGGTTCGGCTCGTCGTTTGTGCGGACGATGACGGAAATCACCAGAGGTC 2700  
AATCCGCTGCCGCCGCATTACGTTTGCCCGAACTGCAAGCATTTCGGAGTT  
CTTTAACGACGGTTCAGTCGGCTCAGGGTTTGATTTGCCGGATAAAAACT 2800  
GCCCGCGATGTGGGACGAAATACAAGAAAGACGGGCACGACATCCCGTTT  
GAGACGTTTCTCGGCTTTAAAGGCGACAAAGTGCCGGATATCGACTTGAA 2900  
CTTTTCCGGCGAATACCAGCCGCGCGCCCACTATAACGAAAGTGCTGT  
TTGGCGAAGACAACGTCTACCGCGCCGGGACGATTGGCACGGTCGCTGAC 3000  
AAAACGGCGTACGGATTTGTCAAAGCGTATGCGAGCGACCATAACTTAGA  
GCTGCGCGGCGCGGAAATCGACGGCTCGCGGCTGGCTGCACCGGGGTGAA 3100  
GCGGACGACCGGGCAGCATCCGGGCGGCATCATCGTCGTCGCGGATTATA  
TGGAATTTACGATTTTACGCCGATTCAATATCCGGCCGATGACACGTCC 3200  
TCTGAATGGCGGACGACCCATTTGACTTCCATTTCGATCCACGACAATTT  
GTTGAAGCTCGATATTCTCGGGCAGCAGATCCGACGGTCATTTCGCATGC 3300  
TGCAAGATTTAAGCGGCATCGATCCGAAAACGATCCCGACCGACGACCCG  
GATGTGATGGGCATTTTCAGCAGCACCGAGCCGCTTGGCGTTACGCCGGA 3400  
GCAATCATGTGCAATGTGCGCACGATCGGCATTCCGGAGTTTGGCACGC  
GCTTCGTTCCGCAAATGTTGGAAGAGACAAGGCCAAAAACGTTTTCCGAA 3500  
CTCGTGCAAATTTCCGGCTTGTCGCGACGGCACCGATGTGTGGCTCGGCAA  
CGCGCAAGAGCTCATTCAAACGGCACGTGTACGTTATCGGAAGTCATCG 3600  
GCTGCCGCGACGACATTATGGTCTATTTGATTTACCGCGGGCTCGAGCCG  
TCGCTCGCTTTTAAATCATGGAATCCGTGCGCAAAGGAAAAGGCTTAAC 3700  
GCCGGAGTTTGAAGCAGAAATGCGCAAACATGACGTGCCGGAGTGGTACA  
TCGATTCATGCAAAAAAATCAAGTACATGTTCCCGAAAGCGCACGCCGCC 3800  
GCCTACGTGTTAATGGCGGTGCGCATCGCCTACTTTAAGGTGCACCATCC  
GCTTTTGTATTACGCGTCGTAATTTACGGTGCGGGCGGAGGACTTTGACC 3900  
TTGACGCCATGATCAAAGGATCACC CGCCATTTCGCAAGCGGATTGAGGAA  
ATCAACGCCAAAGGCATTTCAGGCGACGGCGAAAGAAAAAGCTTGCTCAC 4000  
GGTTCTTGAGGTGGCCTTAGAGATGTGCGAGCGCGGCTTTTCCTTTAAAA  
ATATCGATTTGTACCGCTCGCAGGCGACGGAATTCGTCAATTGACGGCAAT 4100  
TCTCTCATTCCGCCGTTCAACGCCATTCCGGGGGCTTGGGACGAACGTGGC  
GCAGGCGATCGTGCGCGCCCGCGAGGAAGGCGAGTTTTTGTGCAAGGAGG 4200  
ATTTGCAACAGCGCGGCAAATTGTGCAAAACGCTGCTCGAGTATCTAGAA  
AGCCGCGGCTGCCTTGACTCGCTTCCAGACCATAACCAGCTGTGCTGTT 4300

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FIG. 88B

MVTKEQKERFLILLEQLKMTSDEWMPHFREAAIRKVVIDKEEKSWHFFYQ	
FDNVLPVHVYKTFADRLQTAFRHIAAVRHTMEVEAPRVTEADVQAYWPLC	100
LAELOEGMSPLVDWLSRQTPELKGNKLLVVARHEAEALAIKRRFAKKIAD	
VYASFGFPPLQLDVSVEPSKQEMEQLAQKQOEDEERALAVLTDLAREEE	200
KAASAPPSGPLVIGYPIDEEPVRRLLETIVEEERRVVVQGYVFDDEVSEL	
KSGRTLTLTKITDYTNLSILVKMFSRDKEDAELMSGVKKGMWVKVRGSVQN	300
DTFVRDLVIIANDLNEIAANERQDTAPEGEKRVELHLHTPMSQMDAVTSV	
TKLIEQAKKWGHPAIAVTDHAVVQSFPPEAYSAAKKHGMKVIYGLEANIVD	400
DGVPIAYNETHRRLSEETYVVFVDVETGLSAVYNTIIELAAVKVKDGEII	
DRFMSFANPGHPLSVTTMELTGITDEMVKDAPKPDVFLARFVDWAGDATL	500
VAHNASFDIGFLNAGLARMGRGKIANPVIDTLELARFLYPDLKNHRLNTL	
CKKFDIELTQHHRAIYDAEATGHLLMRLKKEAEERGILFHDELNSRTHSE	600
ASYRLARPFHVTLTLLAQNETGLKNLFKLVSLSHIQYFHRVPRIPRSVLVKH	
RDGLLVGSGCDKGELFDNLIQKAPEEVEDIARFYDFLEVHPPDVYKPLIE	700
MDYVKDEEMIKNIIRSIVALGEKLDIPVVATGNVHYLNPEDKIYRKILIH	
SQGGANPLNRHELDPVYFRTTNEMLDCFSFLGPEKAKEIVVDNTQKIASL	800
IGDVKPIKDELYTPRIEGADEEIREMSYRRAKEIYGDPLPKLVEERLEKE	
LKSIIGHGFAVIYLYSHKLVKKSLLDGYLVGSRGSGVSSFVATMTEITEV	900
NPLPPHYVCPNCKHSEFFNDGSGVSGFDLPDKNCPRCGTYKKDGHDI PF	
ETFLGFKGDKVPDIDLNFSGEYQPRAHNYTKVLFGEDNVYRAGTIGTVAD	1000
KTAYGEVVKAYASDHNLELRGAEIDLAAAGCTGVKRTTGQHPGGIIVVPDYM	
EIYDFTPIQYPADDTSSSEWRTHFDFHSIHDNLLKLDILGHDDPTVIRML	1100
QDLSGIDPKTIPTDDPDVMGIFSSTEPLGVTPEQIMCNVGTIGIPEFGTR	
FVRQMLEETRPKTFSELVQISGLSHGTDVWLGNQAELIQNGTCTLSEVIG	1200
CRDDIMVYLIYRGLEPSLAFKIMESVRKGKGLTPEFEAEMRKHDVPEWYI	
DSCKKIKYMFPAKAAAYVLMVARIAYFKVHHPLLYASYFTVRAEDFDL	1300
DAMIKGSPAIRKRIEEINAKGIQATAKEKSLTVLEVALEMCERGFSFKN	
IDLYRSQATEFVIDGNSLIPPFNAIPGLGTNVAQAIVRAREEGEFLSKED	1400
LQQRGKLSKTLLEYLESRGCLDSLPHNQLSLF	

FIG. 89

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